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May 1894

ONTARIO DEPARTMENT OF AGRICULTURE.

TORONTO, MAY 1, 1894.

BULLETIN (SPECIAL).

DAIRYING IN ONTARIO,

Prepared by the Department.

Have Dairy products decreased in price in Ontario as much as grain?

The following statement gives the average market prices of fall wheat, spring wheat, barley and oats in Ontario for the second half of each year, from 1883 to 1892 inclusive. In addition are given the average prices received for the total output of cheese and butter at the factory and creamery for the same years. In 1893 grain prices were lower than in 1892, so that the statement is not so favorable for butter and cheese as if the year 1893 had been included. From these figures it will be seen that the grain prices decreased over 30 per cent. in ten years, dairy prices less than 6 per cent.

	Fall Wheat per bush.	Spring Wheat per bush.	Barley per bush.	Oats per bush.	Factory Cheese per lb.	Creamery Butter per lb.
	Cents.	Cents.	Cents.	Cents.	Cents.	Cents.
1883..........	105.0	107.0	57.0	38.0	10.45	21.33
1884..........	80.5	81.4	53.6	33.1	10.46	21.69
1885..........	81.5	80.6	55.2	31.5	8.12	19.69
1886..........	73.6	72.5	51.3	32.0	9.25	19.52
1887..........	78.4	78.0	56.7	34.6	10.54	20.10
1888.........	102.4	99.3	60.1	40.5	9.24	19.52
1889..........	88.4	88.1	44.0	30.5	9.35	21.01
1890.........	94.2	91.3	50.2	41.1	9.06	19.24
1891..........	95.1	92.9	49.1	36.5	9.35	20.51
1892..........	70.7	67.8	41.3	30.8	9.55	20.59

Is Dairying less exhaustive upon the soil than other methods of farming?

The constituents of which a soil first becomes exhausted are nitrogen, phosphoric acid and potash. The following table gives the amounts of these three removed in $1,000 worth of the different products. If special fertilizers were bought to restore the material removed it would take the quantity stated. The values given are to be considered as relative, merely for comparison. Thus hay removes from the soil 550 times as much fertility as butter of the same value.

$1,000 Worth of	Nitrogen.	Phosphoric Acid.	Potash.	Relative Value
	lb.	lb.	lb.	$
Timothy hay (100 tons)......	2,520	1,060	1,800	550
Wheat (1,400 bush. grain)...	1,980	748	512	410
Barley (2,500 bush. grain)...	1,888	986	600	410
Turnips (10,000 bush. roots)..	1,080	600	2,340	275
Fat cattle (20,000 lb., alive) .	465	310	35	103
Whole milk (10,000 gals.)....	592	200	170	120
Cheese (10,000 lb.)......	450	115	25	88
Butter (5,000 lb.).......	5	....	....	1

From this it will be concluded that the removal of hay from the farm is one of the most exhaustive practices, and the exportation of hay in any large quantity from Ontario should not be desired or encouraged. The sale of live stock instead of grain retains a large portion of the soil constituents of the crop upon the farm. In the matter of dairy products there is a great difference; thus whole milk sold off the farm removes a great deal of soil constituents; cheese removes less, providing the whey is returned to the farm; butter removes practically nothing, providing the skim milk and buttermilk are consumed upon the farm. Dairy farming preserves the fertility of the farm, and in many cases increases it, since some extra food is frequently brought in for feeding. The reason why butter removes so little from the soil is that it consists of material which the plant takes up from the air, and not from the soil.

If high prices for grain should return in the future the dairy farmers will have their soils in the best condition to take advantage of the change if they so desire.

Is Ontario adapted to Dairying?

We have good soil, good water, good stock, good feeding crops and good farmers. On the 175,000 farms of Ontario there are about 800,000 milch cows. At an average of 4,000 lb. per cow these produce 3,200,000,000 lb. of milk, worth $32,000,000 at one cent a pound. The number of cows could be increased, since there are less than 5 cows to the average 130 acre farm. By judicious breeding, selection, feeding and care, the average product per cow may be materially increased. Many of the leading dairy farmers of Ontario produce over 8,000 lb. per cow for their entire herd.

Ontario can grow good crops, as the following statement shows, which gives the average per acre for the ten years 1883-92.

	Fall Wheat.	Spring Wheat.	Barley.	Oats.
	bush.	bush.	bush.	bush.
Ontario	19.5	15.5	25.7	35.2
New York	14.8	....	21.6	27.1
Pennsylvania	12.6	....	....	26.1
Ohio	13.2	....	....	29.9
Michigan	15.6	....	....	31.6
Indiana	12.8	....	....	26.7
Illinois	13.5	....	....	31.5
Wisconsin	....	12.3	23.6	31.0
Minnesota	....	13.0	23.1	31.6
Iowa	....	11.8	22.3	32.1
Nebraska	....	12.3	22.1	30.3

The following statement of the production of factory cheese in Ontario for the ten years 1883-92 shows that this province is well adapted to dairying.

Year.	No. of Factories.	Cheese Made. lb.	Value of Cheese. $	Value of Cheese per lb. Cents.
1892	856	93,848,948	8,959,939	9.55
1891	838	81,929,042	7,656,484	9.35
1890	817	79,364,713	7,189,957	9.06
1889	784	72,592,847	6,787,619	9.35
1888	737	65,299,751	6,031,470	9.24
1887	737	65,638,656	6,918,913	10.54
1886	770	63,721,621	5,893,818	9.25
1885	752	71,209,719	5,781,569	8.12
1884	751	66,939,573	6,998,889	10.46
1883	635	53,513,032	5,589,339	10.45

The following statement gives the rural area and rural population of the leading cheese counties of Ontario, together with the amount of cash that came into each county for cheese made in 1892.

County.	Factories.	Value of cheese made.	Assessed rural area.	Assessed rural population.	Cheese per head.
	No.	$	Acres.	No.	$
Leeds	76	807,360	472,560	21,715	37
Grenville	33	418,157	271,590	13,717	31
Oxford	41	847,643	472,927	30,213	28
Dundas	36	335,069	237,830	14,047	24
Hastings	74	798,937	979,903	35,300	23
Lennox and Addington	26	385,837	429,408	18,270	21
Frontenac	42	348,013	682,262	20,908	17
Middlesex	36	482,599	757,485	45,905	15
Perth	25	432,024	517,916	29,540	15
Lanark	29	307,892	667,961	20,002	15
Stormont	27	232,826	250,578	16,932	14
Northumberland	36	327,554	434,900	25,668	13
Prescott	39	252,707	287,557	19,289	13
Peterboro	29	226,939	543,378	18,761	12
Elgin	24	282,520	437,058	24,723	11
Bruce	22	242,437	835,368	40,527	6
Total	595	6,728,514	8,278,681	395,517	17
Total for Province	856	8,959,939	22,885,464	1,103,433	8

From this it will be seen that these sixteen counties produce just 75 per cent. or three-fourths of the entire cheese made in Ontario. If they all equalled Leeds per head of rural population their total make would be increased by $7,500,000. If the entire province equalled Leeds the total make would be $40,000,000. It will thus be seen that although we have made a fair start in cheese-making we have not by any means reached the limit of our possibilities in dairying. We can greatly increase our output of cheese if desirable, and we can greatly improve the quality of our 50,000,000 pounds of butter by the adoption of the creamery system and by improved methods in the home dairies.

Have the Dairy exports of Canada been increasing or decreasing?

The following statement shows that our cheese exports have been regularly increasing since 1872; that our butter exports dropped to $331,958 in 1889, since when, however, there has been a gradual increase.

Exports of Canadian-made Dairy Products.

Year ending June 30.	Cheese.		Butter.	
	Amount.	Value.	Amount.	Value.
	℔.	$	℔.	$
1872	16,424,025	1,840,284	19,068,448	3,612,679
1877	37,700,921	3,897,968	15,479,550	3,224,981
1882	50,807,049	5,500,869	15,161,839	2,963,156
1887	73,604,448	7,108,978	5,485,509	979,126
1888	84,173,267	8,928,242	4,415,381	798,673
1889	88,534,837	8,915,684	1,780,765	331,958
1890	94,260,187	9,372,212	1,951,585	340,131
1891	106,202,140	9,508,800	3,768,101	602,175
1892	118,270,052	11,652,412	5,736,696	1,056,058
1893	133,946,365	13,407,470	7,036,013	1,296,814

Exports of Cheese from Montreal for 20 Seasons.

Year.	Boxes.	Year.	Boxes.	Year.	Boxes.	Year.	Boxes.
1874	359,252	1879	516,249	1884	1,108,448	1889	1,157,854
1875	507,062	1880	507,019	1885	1,076,601	1890	1,391,298
1876	465,660	1881	551,847	1886	891,965	1891	1,352,670
1877	398,138	1882	677,211	1887	1,104,065	1892	1,651,798
1878	467,676	1883	859,612	1888	1,134,349	1893	1,690,274

What about the exports from the United States?

The cheese exports have fallen off 65,000,000 ℔. from 1881 to 1892, and the butter exports by one-half. Notice the great decrease in butter from 1892 to 1893. There was a great falling off in cheese and butter in 1893 after June 30, not included in this statement. There does not appear to be any reason for concluding that the United States dairy exports will increase in the next few years. In fact we may ere long find a market in the Eastern States for some of our best cheese.

Exports of Dairy Products from United States.

Year ending June 30.	Butter.		Cheese.	
	Amount.	Value.	Amount.	Value.
	℔	$	℔	$
1881	31,560,500	6,256,024	147,995,614	16,380,248
1885	21,683,148	3,643,646	111,992,900	10,444,409
1889	15,504,978	2,568,765	84,999,828	7,889,671
1890	29,748,042	4,187,489	95,376,053	8,591,042
1891	15,187,114	2,197,106	82,133,876	7,405,376
1892	15,047,246	2,445,878	82,100,221	7,676,657
1893	8,920,107	1,672,690	81,350,923	7,624,648

With what countries other than the United States do we compete in the British market?

The following statement of British dairy imports for 1892 shows that while we contributed 46 per cent. of the total imports of cheese, we contributed only less than 3 per cent. of the butter, and none of the condensed milk. The table shows that the United States comes second as a contributor of cheese, and we have just shown that the exports of cheese from that country have been gradually decreasing. In the matter of butter Canada stands seventh, Denmark sending fifteen times as much and Australia one and a half times as much. The table following shows the enormous dairy imports of Great Britain and also the gradual increase in the imports and consumption since 1861.

Average Importations per head of Population.

Years.	Population of United Kingdom.	Butter and margarine.	Cheese.
	No.	lb.	lb.
1861-65	29,459,465	3.9	2.9
1866-70	30,696,335	4.3	3.4
1871 75	32,189,540	4.8	4.7
1876-80	33,929,039	6.2	5.7
1880-85	35,465,817	7.2	5.7
1886-90	36,890,471	8.7	5.8
1891-92	37,952,402	10.1	6.3

British Imports for the Year 1892.

Country.	Butter.		Cheese.		Condensed milk.
	Amount.	Value.	Amount.	Value.	Amount.
	lb.	$	lb.	$	lb.
Denmark	96,715,584	23,597,177	12,880	1,353	448
France	60,780,944	14,733,954	5,107,760	696,946	29,106,000
Sweden........	25,635,120	6,049,344	163,520	14,965	98,112
Holland	15,885,856	3,651,533	30,667,952	3,302,389	14,418,768
Germany	13,914,096	3,474,114	141,680	16,970	589,456
Australasia....	9,802,240	2,308,406	2,865,520	310,927	5,936
Canada	6,671,952	1,244,172	116,323,088	12,135,642	
United States..	5,246,752	930,239	91,664,496	9,545,514	139,440
Belgium	4,328,688	1,044,795	2,916,368	312,795	3,097,808
Russia.........	4,150,832	896,235	146,944	16,693	263,760
Norway	1,055,400	240,301	14,224	1,412	6,060,656
Other countries.	309,544	60,321	51,072	6,076	133,504
Total........	244,497,008	58,230,591	250,075,504	26,361,682	53,913,880 $4,527,402

In what way has Denmark got such a hold upon the British butter market?

In 1892 the butter of Denmark averaged 24.4 cents per pound, that from France 24.2 cents, the rest of the imports 22.8 cents. That from Canada averaged 18.7 cents and that from the United States 17.7. It appears therefore that the highest priced butter came in in largest quantities and the lowest priced in smallest quantity, or that *quality* controls the British market. There was a difference of nearly six cents per pound between Danish butter and Canadian butter. Six cents a pound means a difference of $9.60 for the cow producing only 160 lb. per season.

Let us take a glance at Denmark. The area of the kingdom is 15,289 sq. miles, or 9,784,960 acres; the farm lands of Ontario are 22,646,000 acres in extent. The population of Denmark in 1890 was 2,185,335, of which 882,336 were engaged in agriculture; the population of Ontario in 1891 was 2,114,321, of which about 875,000 were living on farms. Denmark therefore has a total and an agricultural population about equal to Ontario, and a total area less than one-half of the farm lands of Ontario.

In 1865 Denmark exported only 10,837,000 lb. of butter of a very inferior quality; in 1891 she exported over 100,000,000 lb. of the highest quality. The production in 1891 was 170,000,000 lb. In fact of such high quality is the butter, that she imports cheaper butter for home consumption that she may export her own high priced butter. The success of Denmark does not come from her pastures, her climate or her cattle. Practical instruction in butter-making has been carried on; a great improvement has been made in the feeding and care of stock; the system of co-operative dairies has become universal; and the latest improved machinery and inventions of scientific experts applied to their work. The co-operative creamery system was begun in 1881-2, now there are nearly 1,500 creameries with a capacity of from 300 to 1,500 cows each. Denmark now supplies Britain with a large quantity of butter of uniformly good quality, and the supply is regular and constant.

Now let us turn to Ontario and we ask the question:

What has been done in Ontario in the way of making butter in creameries?

The following is taken from the reports of the Bureau of Industries. The amount and value of butter made are for the number of creameries making returns:

CREAMERIES IN ONTARIO.

Year.	No in Operation	No. Making Returns.	Amount Butter Made.	Value of Butter Made.	Value per lb.
			lb.	$	cents.
1892	50	29	1,867,758	384,576	20.59
1891	39	30	1,402,309	287,559	20.51
1890	39	32	1,147,555	220,844	19.24
1889	33	30	876,003	184,067	21.01
1888	31	24	638,215	124,580	19.52
1887	42	25	888,863	118,662	20.10
1886	47	29	823,853	160,798	19.52
1885	27	13	353,347	69,583	19.69
1884	23	8	147,924	32,088	21.69
1883	27	12	243,902	51,817	21.33

In 1892, therefore, less than 3,500,000 pounds of creamery butter were produced in Ontario, which would be less than 10 per cent. of the total butter made in the province; that is, for every pound of creamery butter made there are over 10 pounds of dairy butter made.

What is the difference in price between different grades of butter?

The following prices of butter are taken from the reports of the Toronto wholesale market as found in the daily papers :

PRICES OF BUTTER IN WHOLESALE MARKET, TORONTO.

First of every month.	June 1892 to May 1893.			June 1893 to May 1894.		
	Dairy.		Creamery.	Dairy.		Creamery.
	Lowest.	Highest.		Lowest.	Highest.	
June.........	12	14	....	13	15	....
July	13	14	21	14	18	21
August	12	16	22	16	18	22
September ...	12½	22	22½	16	18	23
October	12	18	....	18	22	25½
November....	13	20	24½	15	21	....
December	13	19	....	16	21	25
January......	12	19	....	16	22	....
February.....	14	20	25	16	20	25½
March........	15	20	25	15	20	23½
April.........	16	22	25	16	21	23½
May..........	17	19	24	14	19	24
Averages...	13.5	18.6	23.6	15.4	19.6	23.7

From the above it will be seen that dairy butter varies as much as seven cents from the poorest to the best, and that creamery butter on the average sells for 4 to 5 cents higher than the best dairy. The quotations for creamery showed but little range each month, seldom more than 1 cent, proving that the quality was uniform. It will be noticed also that creamery butter throughout the year ranged from 21 cents to 26, whereas dairy butter ranged from 13 to 22. We must conclude that creamery butter brings a fairly uniform price and is worth from 4 to 8 cents a pound more than dairy butter. It costs from 3½ to 5 cents a pound to make creamery butter, so that patrons of creameries have been getting more for their cream than home butter-makers have received on the average for their butter.

It will also be noticed that the average price of creamery butter for the past year was just the same as for the previous year, but that the average of the highest prices of dairy butter was 1 cent higher and the average of the lowest prices 2 cents higher than during the previous year. The quality of dairy butter on the market therefore has improved during the past year. This is doubtless due in no small measure to the good work of the Travelling Dairies sent out by the Ontario Department of Agriculture. The improvement of our 50,000,000 pounds of dairy butter to the extent of only 1½ cents per pound means an increase in value of $750,000. If one-half of this could be turned out as first-class creamery butter the value would be increased by about $1,500,000 at the prices of the past year. It will be seen that our creamery butter approaches in price the Danish creamery. The bulk of our exports to Great Britain must have consisted of dairy butter of rather inferior quality—hence the low price received.

Will the use of improved methods increase the quantity of butter?

We have already stated that method tells upon *quality* and that quality makes the price: and that the creamery system supplies butter of uniformly good quality. Now as to *quantity*. At the Dairy Department of the Agricultural College last year, experiment was made upon 3,081 lb. of milk; one-third was creamed by shallow pan, one-third by deep pail and one-third by separator. 127.58 pounds of butter were made in all. The total loss of fat in skim-milk and buttermilk was as follows in each case: by separator 0.47 pounds; by deep pail 1.67 pounds; by shallow pan 3.29 pounds. Thus 2.82 pounds more were lost by shallow pan than by separator. These 2.82 pounds of fat would make over 3 pounds of butter. The average cow produces say 4,000 lb. of milk. Then by shallow pan 12 lb. of butter per cow would be lost by the shallow pan method, which would be retained by the best creamery method. For a herd of ten cows this would make a difference of $25. The ordinary farm method would increase this difference. The conclusion is that by sending the milk to a creamery at least 12 lb. per cow more will be obtained than if the milk is creamed at home in shallow pans.

This is not to be confused with the frauds that profess to make more butter from milk than is contained in the milk.

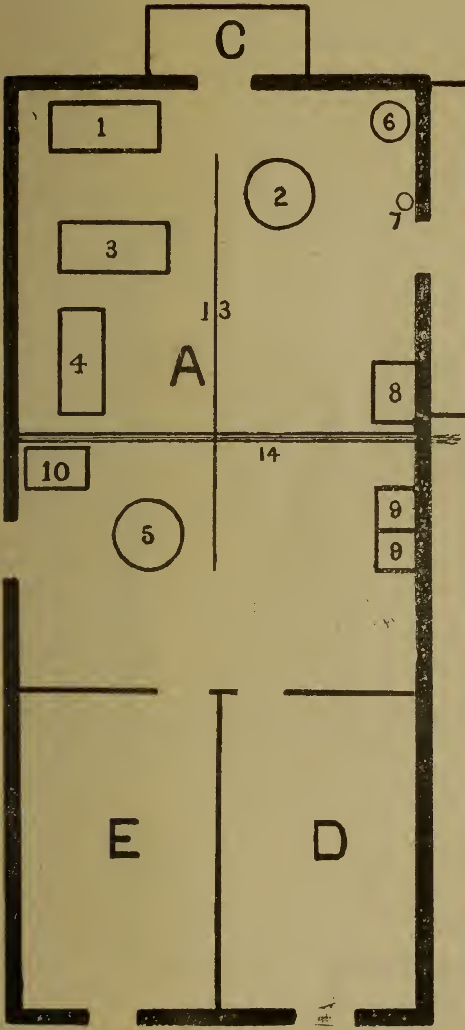
SEPARATOR CREAMERY—DESCRIPTION OF PLAN.

A. Working room, 20 x 30.
B. Boiler-room, 12 x 16.
C. Weighing platform, 4 x 8.
D. Ice house, 10 x 16.
E. Store room, 10 x 16.

1. Receiving vat (elevated 3 ft., or by using pump it may sit on floor).
2. Separator.
3. Cream vat.
4. Churn.
5. Worker.
6. Water tank overhead.
7. Babcock tester.
8. Skim-milk tank (elevated).
9. Cold and hot water boxes.
10. Buttermilk tank.
11. Boiler.
12. Engine.
13. Line of shafting.
14. Gutter.

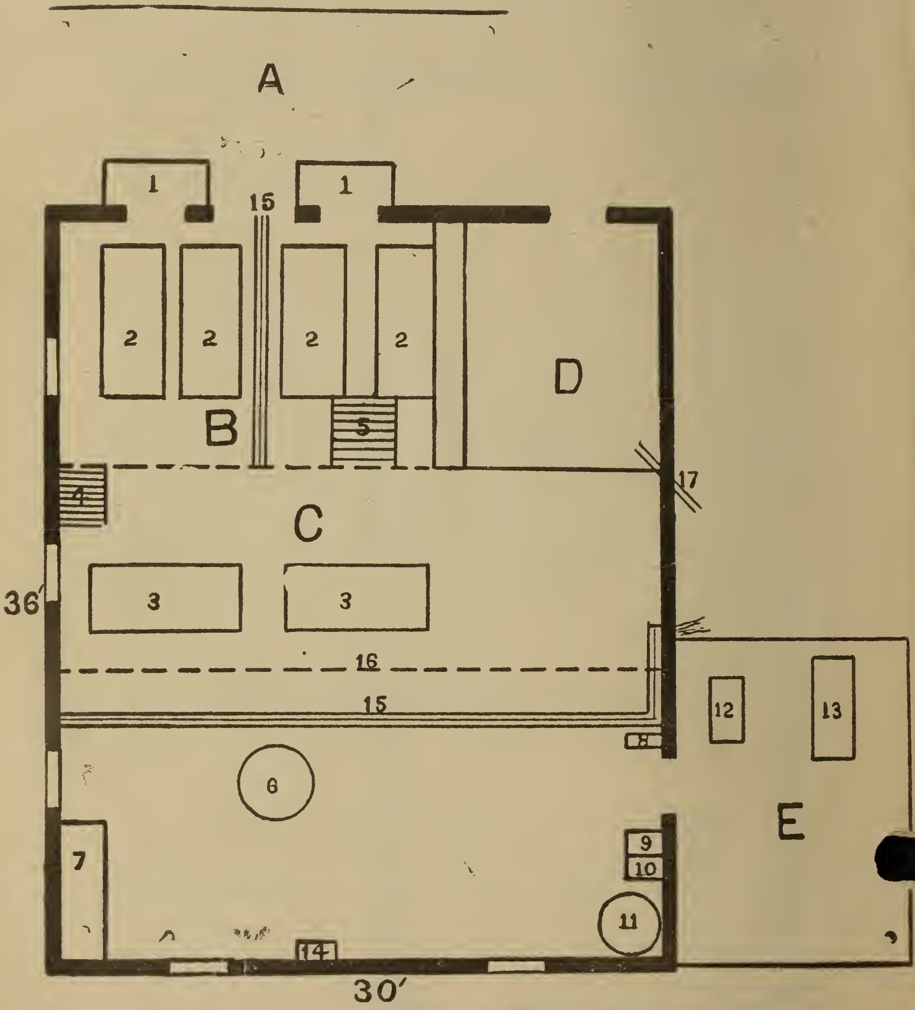
PLAN OF A SEPARATOR CREAMERY.

Capacity, 500 Cows.



PLAN OF CREAMERY ON CREAM-GATHERING PRINCIPLE.

Capacity, 500 to 700 Cows.



CREAM-GATHERING CREAMERY—DESCRIPTION OF PLAN.

A. Covered drive way.
B. Cream platform raised 3 ft.
C. Churning floor.
D. Ice house.
E. Engine and boiler room.

1. Platform for delivery can.
2. Cream vats.
3. Churn.
4. Steps to platform.
5. Steps to storeroom underneath.
6. Worker.
7. Salt table.
8. Oil test churn.
9. Hot water.
10. Cold water.
11. Cold water tank elevated.
12. Engine.
13. Boiler.
14. Desk.
15. Gutter.
16. Line of shafting.
17. Drain from ice house.

Floors in B to slant one inch to gutter, in C to slant two inches to gutter.

What will be the cost of a Factory or Creamery?

The cost of the building will vary from $1,500 to $3,000 according to size and material used. A building may be erected for summer cheese-making alone, for summer cheese and winter butter-making, or for butter-making alone. The following are simple plans for the arrangement of a creamery for working on the separator plan and for working on the cream-gathering plan. In the former the whole milk is drawn sweet to the creamery, the cream at once removed by a separator and the sweet skim-milk taken home; in the other the milk is creamed at home and the cream only brought to the creamery; all things considered the separator creamery is to be preferred. $2,500 to $3,000 will build and equip in first class style a creamery with separator. The territory of any creamery may be enlarged by having skimming stations to which milk is drawn from the surrounding locality. The cream is separated at these stations and then taken to the central creamery to be churned along with the cream from other stations. The equipment for each skimming station will be less than for a complete creamery, the butter will all be uniform and the cost of labor will be less than if several small creameries were established. This is in accordance with the methods of the most successful manufacturing industries. The method is now being tried in Ontario. The creamery at St. Albans, Vt., U.S , is conducted in this way. The milk is separated at 59 different skimming stations throughout the state; the cream is brought to St. Albans by rail and 2,000,000 pounds of butter were made in 1892.

Where it is desired to continue dairying through the winter in a cheese-making district it will be found that it will cost about $250 to make alterations in the factory building, and $750 to put in the appliances for butter-making. Then cheese can be made during the summer and butter during the winter.

What will it cost to equip a Factory?

The following statements give the approximate cost of equipment. From $50 to $75 more may be allowed for extras.

CHEESE FACTORY OUTFIT FOR 500 COWS, EXCLUSIVE OF BUILDINGS.

Boiler and engine	$300 00
Two 600-gallon vats	120 00
One 12-hoop Fraser gang press	85 00
One 6-gang upright press	60 00
One 14-foot curd sink	25 00
One 800-lb scale, double beam	20 00
One 50-gallon weigh can	8 00
Milk conductor, head and pipe	3 50
Two curd knives	12 00
Curd scoop, dipper, pails and thermometer	4 00
One 24-bottle Babcock tester	20 00
One curd mill	20 00
Steam pipe, shafting, pulleys, hangers, etc., about	50 00
	$727 50

OUTFIT FOR A CREAMERY ON THE SEPARATOR PLAN FOR 500 COWS, EXCLUSIVE OF BUILDINGS.

Boiler and engine	$300 00
One separator	400 00
Two 300-gallon cream vats	100 00
One 400-gallon receiving vat	50 00
One 400-gallon churn and butter worker	120 00
One 800-lb. scale, double beam	20 00
One 50-gallon weigh can	8 00
One conductor, head and pipe	3 50
One 24-bottle Babcock tester	20 00
Dippers, pails and thermometers	5 00
Butter ladles and packer	2 00
One tempering vat or heater	20 00
Shafting, belts and pulley, say	75 00
One 240-lb. scale	10 00
	$1,133 50

CREAM GATHERING OUTFIT FOR A CREAMERY OF 500 COWS, EXCLUSIVE OF BUILDINGS.

One boiler and engine	$300 00
Two 300-gallon cream vats	100 00
One 400 gallon churn and butter worker	120 00
One 800-lb. scale, double beam	20 00
One 240-lb. scale—butter	10 00
Ten Curtis refrigerator carrying cans	100 00
One No. 2 oil test churn, Curtis	60 00
Five driver's cases	12 00
Pails, ladles, packers, etc	5 00
Shafting, pulley, belts, etc	50 00
Sundries	10 00
One 50-gallon weigh can	8 00
	$795 00

Outfit of Combined Cheese and Butter Factory on Cream Gathering Plan for 500 Cows, Exclusive of Buildings.

Boiler and engine	$300 00
Two 300-gallon cream vats	100 00
One 400-gallon churn and butter worker	120 00
One 800-lb. scale, double beam	20 00
One 240-lb. scale, butter	10 00
Ten Curtis refrigerator carrying cans	100 00
One No. 2 Curtis oil test churn	60 00
Five driver's cases	12 00
Pails, ladles, packers, etc	5 00
Shafting, pulleys, belts, etc	50 00
One 50-gallon weigh can	8 00
One conductor, head and pipe	5 00
One 24-bottle Babcock tester	20 00
Two 600-gallon cheese vats	120 00
One Fraser gang press	85 00
One 6-gang upright press	60 00
One 14-foot curd sink	25 00
Two curd knives, perpendicular and horizontal	12 00
One curd mill	20 00
Curd scoops, pails, etc	5 00
	$1,137 00

Outfit for Cheese Factory and Creamery Combined, with Separator for 500 Cows, Exclusive of Buildings.

Boiler and engine	$300 00
One separator	400 00
One 400-gallon receiving vat	50 00
Two 300-gallon cream vats	100 00
One 400-gallon churn and worker	120 00
One 800-lb. scale	20 00
One 50-gallon weigh can	8 00
One conductor, head and pipe	3 50
One 24-bottle Babcock tester	20 00
Dippers, mops, thermometers, etc	5 00
Butter ladles, pails and packers	5 00
One tempering vat or heater	20 00
Two 600-gallon cheese vats	120 00
One Fraser gang press	85 00
Six upright gang presses	60 00
One 14-foot curd sink	25 00
Two curd knives	12 00
Curd scoop, pails, etc	5 00
Curd mill	20 00
Shafting and pulleys	75 00
One 240-lb. butter scale	10 00
	$1,463 50

Are there any other advantages in the Co-operative system of butter or cheese-making?

A skilled expert may be employed who will produce a uniform article of high quality and who will do the work more cheaply than it can be done at home upon 50 farms separately. The farmers' wives and daughters will be relieved of a large amount of tedious monotonous work, the cost and trouble of marketing will be avoided and the returns will be *in cash* instead of in store supplies. The feeding of hogs on the by-products can be more satisfactorily carried on under the factory system, in which case the skim-milk is obtained sweet and sweet skim-milk contains more food than partially soured skim-milk.

What is the best way to start a Factory or Creamery?

In localities where the people know very little about the management or requirements of a cheese factory or creamery, it is a good plan to secure the services of some competent person to address a public meeting on the advantages and essentials of co-operative dairying. Seek to get the support and influence of some prominent men in the locality, as the majority are apt to wait and see what action half a dozen leading farmers are going to take. If these men support it, then nearly all are likely to fall into line. It would be well at this or some other meeting to divide the territory into say four sections, and appoint a committee of two in each section to canvass the neighborhood and find out the number of cows within a radius of five or six miles, and the number of men who will pledge the milk from their cows for a term of three or five years, if the factory is erected. After this committee reports there will be some data to proceed upon for future operations. Unless the milk from about 300 cows can be secured, or there is a probability of having this number in the near future, it would not be advisable to build a factory and equip it on a very extensive scale.

The next step would be to select a couple of suitable men to go into cheese and butter districts and gather all the information possible in reference to feeding cows, care of milk and cream, methods of conducting the business, plans of buildings, and all matters pertaining to the dairy. Twenty-five dollars spent in this way may save one hundred and twenty-five dollars in future operations.

What is the method of conducting the business?

There are several ways of starting and conducting the business, but usually it is either what is known as "private enterprise" or the "joint stock company" plan. In the first, some person or persons agree to build a suitable building, equip it properly, and manufacture the milk or cream at a certain rate per pound, the patrons contracting to furnish the milk from a certain number of cows for a certain number of years. In this case the private individual, running all risks as he does, usually charges a higher rate than the joint stock factories. For cheese the rate usually varies from 1½ cents to 2½ cents per pound, the patrons delivering the milk on the milk stand or at the factory, usually the former. For butter the rate varies from 3 to 5 cents per pound.

In the joint stock company method the patrons (and others also) subscribe all or a portion of the money required to build and equip the factory, thus becoming owners of the building and plant as well as of the cows. This method has several advantages, chief of which are—

1. The shareholders, who are chiefly patrons of the factory, have an interest in its welfare, and are more likely to give it hearty support than if it is owned by some one else.

2. The patrons receive the benefit of the profits of manufacture, which may be applied in reducing the cost of manufacture to shareholders to its lowest limit, after all encumbrances have been paid; or a dividend may be declared each year after paying running expenses, cost of repairs, etc.

Some cheese factories are able to haul the milk and manufacture the cheese of shareholders for one cent per pound. (It is usual to charge non-shareholders an excess rate of about one-quarter cent per pound.) Unless there are men in the neighborhood likely to succeed as managers, and who will undertake the work, it would be better to start a factory on a private enterprise plan.

How may a Dairy Company become incorporated ?

By special Act passed March 23rd, 1888, by the Legislature of Ontario, as follows :

AN ACT TO PROVIDE FOR THE INCORPORATION OF CHEESE AND BUTTER MANUFACTURING ASSOCIATIONS.

HER MAJESTY, by and with the advice and consent of the Legislative Assembly of the Province of Ontario, enacts as follows :

1.—(1) At any time hereafter, any five or more persons who desire to associate themselves together for the purpose of manufacturing cheese or butter, may make, sign and acknowledge before a notary public, commissioner or justice of the peace, in duplicate, and file in the office of the registrar of the registry division in which the business is to be carried on, a certificate in writing, in the form mentioned in the schedule to this Act, or to the same effect, together with the rules and regulations, signed by such persons respectively.

(2) The signatures to the rules shall be verified by the affidavit of a subscribing witness thereto, made before a notary public, justice of the peace or commissioner authorized to take affidavits, or before the registrar or deputy-registrar.

(3) Upon the filing of the certificate and rules as aforesaid, the members of the association shall become a body corporate, by the name therein described, with the power to hold such lands as are required for the convenient management of their business.

(4) The registrar or deputy-registrar shall, if desired by the person filing the certificate, endorse on the other duplicate certificate and upon the duplicate of the rules, certificates of the other duplicates having been filed in his office, with the date of filing, and every such certificate shall be *prima facie* evidence of the facts stated therein and of the incorporation of the association.

(5) All rules made by the association may be repealed, altered or amended by other rules passed at a regular meeting called for that purpose, provided no such new rule shall have any force or effect until a copy, proved by the affidavit of the president or other head officer of the association, to be a true copy of the rule or rules passed by the association at a meeting specially called for the purpose of considering the same, has been filed in the registry office in which the certificate of incorporation was filed.

(6) The association shall cause a book to be kept by the secretary, or by som other officer especially charged with that duty, wherein shall be kept,

(*a*) A duplicate of the certificate and of the rules filed as aforesaid in the office of the registrar, so that persons becoming members of the association may sign the said certificate and rules.

(*b*) Any person so desiring to become a member of, or a stockholder in the said association after incorporation as aforesaid, may sign the said certificate and rules in the said book, and shall thereupon become such member, and he shall be entitled to the rights and privileges thereof, and shall become liable as such member as fully as though he had signed the certificate prior to the said incorporation of the association.

2. No association shall be registered under a name identical with that by which any other existing association has been registered, or so nearly resembling such name as to be likely to deceive the public.

3. Any certificate so to be filed may designate any one or more places where the business is to be carried on; but if in different registry divisions, a duplicate must be filed in the registry office of each division.

4. A member of an association incorporated under this Act may have shares therein to an amount mentioned in the by-laws of the association not to exceed $1,000.

5. Before an association commences operations under this Act, they shall agree upon and frame a set of rules for the regulation, government and management of the association, which shall contain—(1) a mode of convening general and special meetings; (2) provisions for audit of accounts; (3) power and mode of withdrawal of members; (4) appointment of managers and other officers and their respective duties, and a provision for filling vacancies caused by death, resignation and other causes.

6. The rules of every association registered under this Act shall bind the association and members thereof to the same extent as if each member had subscribed his name and affixed his seal thereto; and all moneys payable by any member to the association, in pursuance of said rules, shall be deemed to be a debt due from such member ot the association.

7. The capital of the association shall be in shares of such denomination as mentioned in the rules.

8. The shares of the association shall be transferable subject to the consent and approval of the association.

9. All elections shall be by ballot, and each member shall have one vote for each share held by him, in respect of which he is not in default for any calls made thereon.

10. Every dispute between members or between members and the association established under this Act, or any person claiming through or under a member or under the rules of the association, and the directors, treasurer, or other officers thereof, shall be decided by arbitration in manner directed by the rules of the association, and the decision so made shall be binding and conclusive on all parties without appeal.

11. The liability of the shareholders shall be limited, that is to say, no shareholder in such association shall be in any manner liable for or charged with the payment of any debt or demand due by the association beyond the amount of his share or shares subscribed for, and any shareholder having fully paid up the amount of his said share or shares shall be absolved from all further liability.

12. The fees to be charged by the registrar for filing any certificate shall be fifty cents, and for any search relating thereto ten cents.

SCHEDULE.

(*Section 1* (*1*).)

FORM OF CERTIFICATE.

Province of Ontario, } We (*insert names of subscribers not less than five*) do hereby
TO WIT: } certify that we desire to form a company or association pursuant to the provisions of the "Act to provide for the incorporation of Cheese and Butter Manufacturing Associations."

The corporate name of the Association is to be (*insert name of the Association*), and the objects for which the Association is to be formed are (*insert objects for which the Association is formed*). The number of shares is to be unlimited and the capital is to consist of shares of (*insert amount of shares*) each, or of such other amount as shall, from time to time, be determined by the rules of the Association. The number of the trustees who shall manage the affairs of the Association shall be (*insert the number of trustees*), and the names of such trustees are (*insert names of trustees*), and the name of the place (*or* places) where the operations of the said Association are to be carried on is (*or* are) (*insert name of place or places where the operations of the said Association are to be carried on.*)

Dated the day of

(Signatures).

On the day of A. D. 18 , before me personally appeared (*insert names of subscribers to the certificate*) to me known to be the individuals described in the forgoing certificate, and they severally before me signed the said certificate and acknowledged that they signed the same for the purposes therein mentioned.

A. B.,
Justice of the Peace, *or*
Commissioner for taking Affidavits, *or*
Notary Public.

What Acts have been passed by the Legislature in regard to Creameries and Cheese Factories?

AN ACT RESPECTING CREAMERIES (1888).

WHEREAS it is expedient that there should be a uniform standard for milk sent to any creamery for the purpose of being manufactured into butter;

Therefore Her Majesty, by and with the advice and consent of the Legislative Assembly of the Province of Ontario, enacts as follows:

1. All milk containing less than thirteen per cent. of total solids, of which three and three-quarters per cent. must be chemically dry butter-fat, shall be deemed below the standard required in creameries for butter manufacture.

2. The owners or board of management of any creamery in the Province of Ontario, may make such rules and regulations as may be advisable for the due carrying on of the business of the creamery.

3. The patrons of all creameries may be required to subscribe their names to such rules and regulations, and the rules and regulations shall be binding on the patrons, owners or board of management who have so subscribed.

AN ACT TO PROVIDE AGAINST FRAUDS IN THE SUPPLYING OF MILK TO CHEESE OR BUTTER MANUFACTORIES, AS AMENDED BY 55 VIC. AND 57 VIC.

HER MAJESTY, by and with the advice and consent of the Legislative Assembly of the Province of Ontario, enacts as follows:

1. No person shall sell, supply, bring or send to a cheese or butter manufactory, or the owner or manager thereof, to be manufactured, milk diluted with water, or in any way adulterated, or milk from which any cream has been taken, or milk commonly known as "skimmed milk," without distinctly notifying, in writing, the owner or manager of such cheese or butter manufactory, that the milk so sold, supplied or brought to be manufactured has been so diluted with water, or adulterated, or had the cream so taken from it, or become milk commonly known as "skimmed milk," as the case may be.

2. No person who, in the course of his business, sells, supplies, brings or sends to any cheese or butter manufactory, or the owner or manager thereof, to be manufactured, the milk of cows, shall in the course of such dealing and business, keep back any part of the milk without distinctly notifying, in writing, the owner or manager of such cheese or butter manufactory what portion of the milk he has so kept back.

3. No person shall sell, supply, bring or send to a cheese or butter manufactory, or the owner or manager thereof, to be manufactured, any milk that is tainted, or partly sour, without distinctly notifying, in writing, the owner or manager of such cheese or butter manufactory of such milk being tainted or partly sour.

The said sections 1, 2 and 3, shall not apply where the person charged with the offence proves to the satisfaction of the justice or justices of the peace that the dilution or adulteration of the milk, or the keeping back of the strippings, was without his knowledge or privity, and contrary to his wish and intention; and that he was not aware of the dilution or adulteration or keeping back as aforesaid at the time or before so selling, supplying, bringing or sending the milk as in the said sections mentioned; or (as the case may be) was not aware at the time of or before the selling, supplying, bringing or sending the milk that the same was tainted or partly sour.

4. Any person who, by himself, or by his servant or agent, violates any of the provisions of the preceding sections of this Act, upon conviction thereof before any justice or justices of the peace, shall forfeit and pay a sum of not less than $5 nor more than $50, together with the costs of prosecution, in the discretion of such justice or justices, and in default of payment of such penalty and costs, shall be liable to be committed to the common gaol of the county, with hard labor, for any period not exceeding six months, unless the said penalty and the costs of enforcing same be sooner paid.

5. It shall be lawful for the owner or manager of a cheese or butter manufactory to require the owner or custodian of any cow or cows whose milk is being bought for or supplied or sent to the manufactory, to submit such cow or cows at his farm, or other premises where such cows are usually kept, to such milk test, by persons named by such owner or manager, as may be necessary for the said persons to ascertain the quantity and quality of the milk of such cow or cows, on any day, and at such time on any such day as may be appointed by said owner or manager, and in case the owner or custodian of the cows refuses to so submit them, or obstructs in the execution thereof the persons engaged in making the milk test, or interrupts the test, or interferes in any way with the test, or the application of its result, he shall, on complaint before any justice or justices of the peace, forfeit and pay for every such offence a sum of not less than $10 nor more than $100, in the discretion of the justice or justices of the peace who may hear such complaint, together with the costs of the prosecution, if so ordered, and in default of payment of such penalty and costs, shall be liable to be committed by such convicting justice or justices of the peace, to the common gaol of the county, with hard labor, for any period not exceeding six months, or until said penalty and the costs of enforcing same be sooner paid.

6. It shall be lawful for the owner or manager of any cheese or butter manufactory who suspects any person of selling, supplying, sending or bringing milk to the manufactory, of any offence under this Act, to enter upon or to appoint some person or persons to enter upon, and such appointed person may enter upon the premises of the suspected person, with or without notice, and take samples of milk from the cow or cows from which the supposed offender was or had been immediately before then procuring the milk or part of the milk so sold, supplied, sent or brought as aforesaid, and any such suspected person who obstructs or refuses to permit the taking of any such sample shall, on conviction thereof, be liable to a penalty of not less than $10 nor more than $50 with costs of the prosecution, and in default of payment thereof, shall be liable to be imprisoned in the common gaol of the county in which the offence has been committed for a period not exceeding three months with hard labor.

7. For the purpose of establishing the guilt of any person under the first three sections of this Act, it shall be sufficient *prima facie* evidence to show that such person, by himself, his servant, or agent, sold, supplied, sent or brought, to be manufactured, to any cheese or butter manufactory, milk substantially below the standard of that actually drawn, or by the accused represented as having been drawn from the same cow or cows within the then previous or subsequent week, provided the comparison or test is made by means of a lactometer and cream gauge, or by some other adequate means of making the comparison.

7*a*. In any complaint made or laid under the first three sections of this Act, and in any conviction thereon, the milk complained of may be described as deteriorated milk, without specification of the cause or mode of deterioration, and such description shall be a sufficient description of the offence to sustain a conviction, and in any complaint, information or conviction under this Act the matter complained of may be declared, and shall be held to have arisen within the meaning of *The Summary Convictions Act*, at the place where the milk complained of was to be manufactured, notwithstanding that the deterioration thereof was effected elsewhere.

8. Any pecuniary penalty under this Act shall, when recovered, be payable one-half to the informant or complainant, and the other one-half to the owner, treasurer or president of the manufactory to which the milk was sent, sold or supplied for any of the purposes aforesaid in violation of any of the provisions of this Act, to be distributed among the patrons thereof in proportion to their respective interests in and profits thereof, and all provisions of *The Summary Convictions Act* shall, so far as applicable, apply

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AN ACT TO AMEND THE ONTARIO JOINT STOCK COMPANIES' LETTERS PATENT ACT.

Chap. 35, 1892.

HER MAJESTY, by and with the advice and consent of the Legislative Assembly of the Province of Ontario, enacts as follows :

1. A company incorporated by letters patent under the provisions of *The Ontario Joint Stock Companies' Letters Patent Act*, or under the provisions of any Act of the Legislature of the former Province of Canada for the manufacture of cheese, may, without obtaining supplementary letters patent, carry on the business of manufacturing and selling butter, provided the shareholders shall, by a vote of not less than two-thirds in value of those present in person, or by proxy, at a general meeting of the company duly called for considering the subject, determine to extend its business so as to include the manufacture and sale of butter.

2. A manufacturing association formed under the provisions the Act passed in the 51st year of Her Majesty's reign, intituled *An Act for the incorporation of Cheese and Butter Manufacturing Associations*, for the manufacture of cheese, may on and subject to the making of a rule for that purpose in accordance with the provisions of the said last mentioned Act, extend its business so as to include the manufacture and sale of butter.

CONCLUSIONS.

1. Prices for grain have fallen over 30 p
years; prices for butter and cheese have fa
per cent.

2. Dairy farming is less exhaustive than gra
The sale of butter removes nothing from the soil.
dairying, the lost fertility of the soil may be resto

3. Ontario is well adapted to dairying. We prod
90,000,000 lb. of factory cheese, 3,000,000 lb. of cr
butter, and about 50,000,000 lb. of dairy butter.
Canadian dairy exports have been increasing those o
United States have been decreasing.

4. Our principal butter competitors in the British mark
are Denmark, France and Sweden. Victoria and New Zea
land are rapidly increasing their exports to Britain, exceeding
those from Canada.

5. Whereas our best creamery brings as high price as Danish creamery in Britain, our exports to Britain averaged over 5 cents per lb. less than the Danish exports. Our exports to Britain therefore consist largely of butter of inferior quality.

6. The production of our butter in creameries instead of in home dairies would give a large amount of high class butter of uniform quality both for home consumption and for export, and would add over $1,000,000 to its value.

7. Patrons of creameries get as much for their cream as home butter-makers do for their butter; they are saved the work of making and marketing; they are paid in cash and returns come quickly.

8. A separator creamery with capacity for 500 cows can be built and equipped for from $2,500 to $3,000. Skilled butter-makers and cheese-makers are now becoming more available through the work of the Special Dairy School of Ontario Agricultural College, Guelph.

9. To show that we have made only a fair beginning in dairying, it may be stated that the average value of cheese made per head of the rural population in Ontario is $8; whereas Leeds, Grenville and Oxford average $32 per head.

10. In grain growing we are competing in foreign markets with the products of the cheapest labor in other countries; in beef and mutton also we compete with the products of cheap land; in dairying we are competing with the work of more skilled labor, and with the products of high-priced land. The outlook for dairying in Ontario, therefore, is promising, provided we aim to produce a constant supply of uniformly good articles, namely, fine factory cheese and fine creamery butter.

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1895-96

DEPARTMENT OF AGRICULTURE,
TORONTO, ONTARIO.

BULLETIN (SPECIAL.)

MEETINGS OF FARMERS' INSTITUTES.

AND OTHER ASSOCIATIONS.

1895-1896.

PUBLISHED BY THE ONTARIO DEPARTMENT OF AGRICULTURE.

TORONTO:
PRINTED BY WARWICK BROS. & RUTTER.

MEETINGS OF FARMERS' INSTITUTES,

1895-6.

In this bulletin are announced 183 regular and 141 supplementary meetings, a total of 324. In 1894, the Farmers' Institute Bulletin (special) announced 132, and in 1893, 137 meetings.

The meetings in each division have been officially asked for by the local institutes and the places of meeting selected by them.

Notice is directed to the fact that the names of some of the delegates are followed by a star (*), others by a dagger (†). This indicates that these delegates will attend only the meetings in their division, that are marked in like manner. See division 1. Prof. J. H. Reed's name is followed by a star (*), and a star (*) is set before the first seven meetings. This indicates that Prof. Reed will attend only these meetings. G. C. Caston will follow him, attending all meetings before which a dagger (†) is placed. Where speakers are changed in other divisions the same system is followed.

In choosing delegates, specialists are selected as far as possible. In some cases these may not be prepared to discuss the topics of most interest in certain sections. In such cases, the local officers should employ additional persons, specially suited to deliver addresses of the desired character.

The time likely to be occupied in delivering each address and a suitable time for discussion is given in each case; this is to enable officers to prepare a program as required by section 23, page 137, of the Farmers' Institute Report for 1894.

The meetings here announced are the first to be conducted under the "Act and Rules governing Farmers Institutes in Ontario," published in the Annual Report of Farmers Institutes for 1894, pages 134 to 154 inclusive. This report was mailed to all officers and members, but anyone desiring a copy will please apply by letter to the Department of Agriculture, Toronto. Institute officers and other interested parties are urged to make themselves familiar with this Act and Rules and to conduct the respective institutes as nearly as possible, on the lines there laid down. Attention is especially directed to the following clause: clause 11, page 136, decrees, that the institute year shall begin July 1st and end June 30th, in each and every year, and that the *annual meeting of each institute* shall be held on the *second Tuesday in June in each and every year*; at this meeting the *officers, directors, etc, shall be elected.* The *first* of said annual meetings shall be held in *June 1896.* Officers and directors in office when the Regulations were adopted by Order in Council (August 13th, 1895), shall continue in office until June, 1896. Members who join late in the institute year will, as far as available at the time, be supplied with the various bulletins and reports published by the Department of Agriculture during the current year.

The regular and supplementary meetings announced in this bulletin shall be conducted and advertised as directed in sections 17 to 28, inclusive of the Act and rules before mentioned. These sections are published on pages 137 and 138 of the report referred to.

The attention of the officers and directors is also called to clauses 48, 50, 51, 55, 57, 58 and 59. See pages 140 and 141 of said report. Pages 141 to 148 contain suggestions to institute officers and others, which, if carefully read, will be very helpful. Pages 143 to 147, should be studied in connection with clause 23, page 137.

REGULAR DELEGATES AND SUPPLEMENTARY SPEAKERS.

The rules governing regular delegates and supplementary speakers, are published on pages 148 and 149 of the institute report for 1894.

When not otherwise stated at a one-day meeting, the delegates will *assist local talent* during the afternoon and evening; at a two-day meeting, they will assist at an afternoon and an evening meeting the first day and at a morning and an afternoon meeting the second day. Morning meetings will open promptly at 10.30; afternoon meetings at 1.30; evening meetings at 7.30. All meetings should be opened at the time advertised, whether the house is well filled or not. Delegates and officers are requested to carry out this provision.

If, from sickness or any other cause, a delegate who is advertised in this bulletin, cannot fulfil his engagements, another person competent to discuss similar subjects will be sent in his place. But every precaution will be taken to prevent the necessity of changes.

Institute officers are requested to select immediately from among the topics published under each speaker's name, those which they wish discussed, and at once acquaint said speaker as to their choice. (See clauses 23 and 24, pages 137 and 138 of institute report.)

The Department defrays the cost of sending regular delegates to regular meetings, but officers, directors, and members of institutes are expected to lighten as far as possible, the expenses of the delegates, by meeting them at the railroad station and conveying them, *free of expense*, to the place of meeting, and returning them again to the station or forwarding to the next place of meeting. The name and address of the officers of each institute is given in this bulletin, that they may correspond one with the other and arrange details of this nature.

Supplementary speakes are sent at the request of officers to assist local talent to hold supplementary meetings. The Department will pay for the services of these persons; but the institutes requesting their services shall pay all travelling expenses. (See clause 21, page 137, of before mentioned report). The expenses of each supplementary speaker will be paid by the Superintendent, to the first place of meeting and from the last place of meeting to his or her home. The expenses so paid will be equitably divided between the districts visited by said speakers and charged to the respective districts.

Regular delegates and supplementary speakers published in this bulletin have a heavy task before them. Institute officers are urged to render tham all the assistance in their power.

Where a popular program is desirable for an evening meeting, as it is in many places, the officers are respectfully requested to furnish this by employing suitable talent. (See page 137 of institute report for 1894, clause 19, and give special attention to the last three lines.)

The professors of the Ontario Agricultural College, have annually addressed the institutes throughout the province for over a decade. They do this work during their holidays and for it they receive no remuneration.

NOTES.

The very low price of farm produce and a short crop in many sections of the province, lead us to believe that never before was earnest study of the best methods so necessary as now.

The institutes will be conducted by practical farmers upon practical lines. All are invited to attend and add their mite to the general fund of information.

Institute officers should hold meetings of farmers and business men, at points where meetings are to be held, at least three weeks before the said meeting convenes, for the purpose of engaging a hall and providing an evening program; also to secure some of the best farmers to read papers on branches of farming in which they excel, *and two or three ladies to give papers on some phases of home life or domestic economy.* Well managed, these 324 institute meetings should give large returns.

Business and professional men are cordially invited to co-operate with the farmers in making these meetings instructive and successful. It is reasonable to expect them to do so, for the success of all classes depends on the farmer. The more successful the farmer, the more successful are all others.

I wish to thank institute officers for the hearty support and cooperation I have received from them during the past year. Many of these men have, without stint, given their time and talents to institute work, frequently without remuneration. It is hoped that it may be possible at an early date to arrange so that officers may be at least partially paid for their services.

Blank forms, etc., etc., as provided in clauses 46 and 56, pages 139 and 140, of the annual report for 1894, will be prepared and forwarded to the institutes as soon as possible. In the meantime secretaries are requested to use those they now have.

F. W. HODSON,
Superintendent of Farmers' Institutes.

Ontario Agricultural College,
Guelph, Ont.

REGULAR MEETINGS.

DIVISION I.

J. H. REED, V.S., Professor of Veterinary Science, O. A. C., Guelph.*

"Breeding Horses for Profit," lecture and discussion, one hour ; "The Laws of Breeding," lecture and discussion, fifty minutes ; "The Common Diseases of the Stomach of the Ox," lecture and discussion, fifty minutes ; "The Mare and her Foal," lecture and discussion, one hour. Evening subjects, "The Education of the Horse," lecture, twenty-five minutes ; "The Ontario Agricultural College," lecture, thirty minutes.

G. C. CASTON, Craighurst.† (Alternate with Prof. Reed.)

"The Best Varieties of Orchard Fruits and How to Grow Them, Special Reference being made to Top Grafting on Hardy Stock," lecture and discussion, one hour ; "Best Varieties of Small Fruits and the Modes of Cultivation," lecture and discussion, thirty minutes ; "Poultry on the Farm," lecture and discussion, thirty minutes. Evening subjects: "Horticulture on the Farm," lecture thirty minutes ; "Lights and Shadows of Farm Life," lecture, thirty minutes ; "The Ontario Agricultural College," lecture thirty minutes.

SIMPSON RENNIE, Milliken.

"Underdraining," lecture, forty minutes ; "Destruction of Weeds," lecture, forty minutes ; "The Cultivation of Potatoes and Field Roots," lecture, thirty minutes ; "Buying and Feeding Cattle for the

British Market," lecture, thirty minutes. Evening subjects, "Agriculture in Public Schools," "The Ontario Agricultural College, "Country Roads."

*1.	Milverton	N. Perth	Jan. 7th.
*2.	Listowel	N. Perth	" 8th.
*3.	Clifford	W. Wellington	" 9th.
*4.	Mildmay	S. Bruce	" 10th.
*5.	Walkerton	S. Bruce	" 11th.
*6.	Paisley	C. Bruce	" 13th.
*7.	Port Elgin	N. Bruce	" 14th.
†8.	Tara	N. Bruce	" 15th.
†9.	Durham	S. Grey	" 16th.
†10.	Holstein	S. Grey	" 17th.
†11.	Moorefield	W. Wellington	" 18th.
†12.	Drayton	W. Wellington	" 20th.
†13.	Arthur	E. Wellington	" 21st and 22nd.
†14.	Auburn	W. Huron	" 23rd and 24th.
†15.	Kincardine	C. Bruce	" 25th.
†16.	Brussels	E. Huron	" 27th and 28th

Division II.

J. Hoyes Panton, M.A., F.G.S., Professor of Natural History and Geology, O. A. C., Guelph.*

"Water in Relation to Farm Crops," "Weeds," "Spraying; Why, When, and How," "Influence of Plants on the Soil," "Nitrogen in Agriculture," "Insect Foes," "External Parasites on Domestic Animals." Evening subjects, "The Threshold of Life," "The Sun in Relation to Life," "How to Teach Science in Rural Schools," "The Ontario Agricultural College," each lecture and discussion, one hour.

Thos. McMillan, Seaforth.

"Breeding and Feeding Beef Cattle," "Corn Growing and the Silo," "Land Drainage," "Care and Application of Manure," "Cultivation of the Soil for Grain and Root Crops," "Dehorning and its Advantages," "Breeding and Feeding Heavy Draught Horses," "Making our Way in Life," Farm Life, its Conditions and Requirements," each lecture twenty minutes.

A. H. Christian, B.S.A., O. A. C., Guelph.

"Silo and Silage," "Weeds," "Insects and How to Fight Them," "Science in Feeding," lectures, thirty minutes, discussion, fifteen minutes. Evening subjects, "Farm Implements, Uses and Abuses," "The Ontario Agricultural College," lectures, twenty minutes.

J. E. Meyer, Kossuth.† (Alternate with Prof. Panton.)

“How to Make the Most Money out of Poultry on the Farm,” lecture, thirty minutes, discussion, twenty minutes; “The Best Breeds of Poultry for the Farmer,” lecture, fifteen minutes, discussion, fifteen minutes; “The Selection of a Herd of Cattle,” lecture, fifteen minutes, discussion, fifteen minutes; “The Rearing and Management of Poultry on the Farm,” lecture, twenty minutes, discussion, twenty minutes; “How to Obtain the Greatest Return from the Farm,” lecture, twenty-five minutes, discussion, twenty minutes; “Cultivation of the Soil,” lecture, thirty minutes.

*1.	Brucefield	S. Huron	Jan.	7th.
*2.	Exeter	S. Huron	“	8th.
*3.	Parkhill	N. Middlesex	“	9th.
*4.	Wyoming	E. Lambton	“	10th.
*5.	Petrolea	W. Lambton	“	11th.
*6.	Brigden	W. Lambton	“	13th.
*7.	Inwood	E. Lambton	“	14th.
†8.	Napier	W. Middlesex	“	15th.
†9.	Coldstream	N. Middlesex	“	16th.
†10.	St. Marys	S. Perth	“	17th and 18th.
†11.	Thorndale	E. Middlesex	“	20th.
†12.	Dorchester Station	E. Middlesex	“	21st.
†13.	Ingersoll	S. Oxford	“	22nd.
†14.	Embro	N. Oxford	“	23rd.
†15.	Innerkip	N. Oxford	“	24th.

Division III.

Wm. Rennie, Farm Superintendent, O. A. C., Guelph.†

“Clover Culture,” “Culture of Field Roots,” “Rotation of Crops,” “Ridding the Land of Weeds,” “Stock Feeding,” “Beautifying the Farm.”

Prof. Geo. Harcourt, St. Ann’s.

“Fodder Corn and the Silo,” lecture, thirty minutes, discussion, thirty minutes; “Winter Dairying,” lecture, twenty minutes, discussion, fifteen minutes; “Dairy Farming,” lecture, twenty minutes, discussion, fifteen minutes; Care of Milk for Cheese Factories,” lecture, fifteen minutes, discussion, fifteen minutes; “Butter-making,” lecture, fifteen minutes, discussion, fifteen minutes,; “Raising Calves,” lecture, twenty minutes, discussion, fifteen minutes; “Stock Breeding,” lecture, forty-five minutes; “Stock Feeding,” lecture, one hour; “Rotation of Crops,” lecture, forty-five minutes; “How to Obtain a Good Dairy Herd,” lecture, twenty minutes, discussion, twenty minutes; “The Dairy Cow,” lecture, fifteen minutes, discussion, fifteen minutes. Evening subjects, "The Future Farmer," lecture, thirty minutes; "The Ontario Agricultural College," lecture, thirty minutes; "Leakages on the Farm," lecture thirty minutes.

D. Z. GIBSON, Willow Grove.

"Fertilizers," "Vegetable Mould in the Soil," lecture, twenty-five minutes; "Principles of Breeding," lecture, thirty minutes; "Skill in Feeding Stock," lecture, twenty-five minutes. Evening subjects, "Progressive Agriculture," lecture, twenty-five minutes; "Ontario Agricultural College," lecture, thirty minutes; "Cultivation of the Mind," lecture, thirty minutes.

†1.	Glencoe	W. Middlesex......	Jan. 7th.
†2.	Kentbridge	E. Kent	" 8th
†3.	Chatham..........	W. Kent..........	" 9th.
†4.	Harrow	S. Essex	" 10th and 11th.
†5.	Canard River......	N. Essex	" 13th.
†6.	Paquette Station ..	N. Essex	" 14th.
7.	Valetta	W. Kent	" 15th.
8.	Highgate	E. Kent	" 16th.
9.	West Lorne	W. Elgin..........	" 17th.
10.	Shedden	W. Elgin..........	" 18th.
11.	Aylmer	E. Elgin	" 20th and 21st.
12.	Delhi	N. Norfolk	" 22nd.
13.	Vittoria	S. Norfolk	" 23rd.
14.	Port Rowan	S. Norfolk	" 24th.
15.	Waterford	N. Norfolk........	" 25th.
16.	Norwich	S. Oxford	" 27th.

DIVISION IV.

H. L. HUTT, B.S.A., Horticulturist, O. A. C., Guelph.*

"The Proper Management of an Orchard," "Growing Small Fruits," "Potato Culture," "The Farmer's Vegetable Garden," lectures, thirty minutes, discussion, thirty minutes. Evening subjects, "A Talk to Farmers' Sons," "The Care of Flowers and House Plants," "The Ontario Agricultural College," lectures, thirty minutes.

T. G. RAYNOR, B.S.A., Rosehall.

"Selection and Cross-breeding of Animals," "Foods," "Our Fodder Crops," "The Dairy Cow," "Common Diseases of Domestic Animals," "Planting and Care of an Orchard," "Improving an Impoverished Farm," "Clover Culture," "Special Fertilizers," "Injurious Insects and Parasitic Plants on the Farm," "Swine Breeding and Feeding," "Management ot Poultry," lectures, twenty-five minutes, discussions, fifteen minutes. Evening subjects, "Tillage," "Farming as an Occupation," "Agricultural Education," "The Ontario Agricultural College," lectures, thirty minutes.

M. Pettit, Winona.† (Alternate with Mr. Hutt.)

"The Care of Nursery Stock," "Spraying," "Protection of Forests." Evening subjects, "Refining Influences of Horticulture."

Mungo McNabb, Cowal.

"Beef Production," "Sheep Breeding and Management," "Underdraining," "Corn Growing," "Country Roads," lectures, thirty minutes, discussions, twenty minutes. Evening subjects, "Fertility," "Boys on the Farm," lectures twenty-five minutes.

*1.	St. George	N. Brant	Jan.	7th and 8th.
*2.	Burford	S. Brant	"	9th.
*3.	Brantford	S. Brant	"	10th.
*4.	Caledonia	Haldimand	"	11th.
*5.	Cayuga	Haldimand	"	13th.
*6.	Attercliffe Station	Monck	"	14th.
†7.	Humberstone	Welland	"	15th.
†8.	Marshville	Monck	"	16th.
†9.	Welland	Welland	"	17th.
†10.	Beamsville	Lincoln	"	20th and 21st.
†11.	Stoney Creek	S. Wentworth	"	22nd.
†12.	Ancaster	S. Wentworth	"	23rd.
†13.	Waterdown	N. Wentworth	"	24th.
†14.	Freelton	N. Wentworth	"	25th.

Division V.

A. McNeill, M.A., Windsor.

"How and When to Spray for Insects and Fungus Diseases," lecture, forty minutes, discussion, twenty minutes; "Apple Culture," lecture, thirty minutes, discussion, thirty minutes; "Every Farmer His Own Mason, or How to use Concrete in Farm Structures," lecture, forty-five minutes, discussion, fifteen minutes; "Fruit Growing with General Farming," lecture and discussion, forty-five minutes; "Fruit Growing as a Specialty," lecture and discussion, forty-five minutes; "Underdraining," lecture, twenty-five minutes, discussion, twenty minutes. Evening subjects, "The Education of the Farmer," lecture, forty minutes; "The Social Side of Farm Life," lecture, thirty-five minutes; "Some Insect Friends and Foes," lecture, thirty-five minutes; "The Ontario Agricultural College."

R. Harcourt, B.S.A., Assistant Chemist, O. A. C., Guelph.*

"Milk and its Products," lecture and discussion, one hour; "Drainage; its Importance to Farmers," lecture and discussion, one hour; "How to Improve the Fertility of the Farm," lecture and discussion, forty minutes; "Rotation of Crops," lecture and discussion, thirty minutes ; "Cattle Feeding," lecture and discussion, thirty minutes. Evening subjects, "Evening Studies on the Farm," "The Ontario Agricultural College."

W. S. **Fraser**, Bradford.

"Clover Growing and Curing," lecture, ten minutes ; "Hog Raising," lecture, ten minutes ; "Sheep Raising for Profit," lecture, ten minutes ; "Corn and the Silo," lecture, fifteen minutes ; "Underdraining," lecture, twenty minutes. Evening subjects, "Butter-making on the Farm," lecture, thirty minutes ; "Farmers' needs."

*1.	Nelson	Halton	Jan. 7th.
*2.	Milton	Halton	" 8th.
*3.	Brampton	Peel	" 9th and 10th.
*4.	Camilla	Dufferin	" 11th.
*5.	Markdale	C. Grey	" 13th.
*6.	Shelburne	Dufferin	" 14th.
7.	Owen Sound	N. Grey	" 15th.
8.	Hillsburg	C. Wellington	" 16th.
9.	Elora	C. Wellington	" 17th.
10.	Hespeler	S. Waterloo	" 18th.
11.	Guelph	S. Wellington	" 20th and 21st.
12.	Hawkesville	N. Waterloo	" 22nd.
13.	Berlin	N. Waterloo	" 23rd.
14.	New Hamburg	S. Waterloo	" 24th.

Division VI.

G. E. **Day**, B. S. A., Agriculturist, O. A. C., Guelph. (At meetings marked.*)

"Management of Dairy Cattle," "Feeding Standards and Composition of Foods, (Illustrated with chart,) lecture, thirty minutes, discussion, thirty minutes ; "Selection in Stock Breeding," "Soiling and Soiling Crops," "Corn and the Silo," "Manures," "Management of Breeding Sows," lecture, twenty-five minutes, discussion, twenty minutes. Evening subjects, "Invisible Plants," "The Ontario Agricultural College," lecture thirty minutes.

L. **Patton**, Oxford Mills.

"Care and Management of Dairy Cattle," lecture, thirty minutes, discussion, twenty minutes ; "Is the Butter-fat in Milk a Fair Guide to its Value for Cheese-making," lecture, thirty minutes, discussion, twenty minutes ; "Science in Dairying," lecture, twenty minutes, discussion, ten minutes ; "Dairying as Compared with other Branches of Farming from a Financial Standpoint," lecture, twenty-five minutes, discussion, fifteen minutes ; "Can Winter Dairying be made Profitable," lecture, twenty minutes, discussion, fifteen minutes; "The Most Successful Fodder Crops for successful Dairying and Preservation of the Fertility of the Soil," lecture, thirty minutes, discussion, fifteen minutes; "The Babcock Test in the Dairy and the Advantages to be Derived from its Use," lecture, twenty minutes, discussion, ten minutes. Evening subjects, "How to make Farm Life Attractive," "The Successful Farmer," "The Ontario Agricultural College.

JAMES SHEPPARD, Queenston.

"Country Roads," lecture and discussion, one hour; "Grapes, Growing and Pruning," lecture and discussion, forty minutes; "The Care and Cultivation of Peaches," lecture and discussion, forty minutes; "Small Fruits for Home and Market," lecture, forty minutes; "The Cultivation of Tomatoes for Home and Market," lecture and discussion, forty minutes; "Propagating Fruits, Grafting, Budding, etc., Illustrated and Demonstrated," lecture and discussion, one hour. Evening subjects, "The Bicycle and the Agriculturist," "Agriculture in the Public Schools."

*1.	Weston	W. York	Jan.	7th.
*2.	Woodbridge	W. York	"	8th.
*3.	Cookstown	S. Simcoe	"	9th.
*4.	Creemore	W. Simcoe	"	10th.
*5.	Duntroon	W. Simcoe	"	11th.
*6.	Meaford	N. Grey	"	13th.
*7.	Thornbury	C. Grey	"	14th.
8.	Midhurst	C. Simcoe	"	15th.
9.	Orillia	E. Simcoe	"	16th.
10.	Midland	E. Simcoe	"	17th.
11.	Elmvale	C. Simcoe	"	18th.
12.	Churchill	S. Simcoe	"	20th.
13.	Aurora	N. York	"	21st and 22nd.

DIVISION VII.

A. E. SHUTTLEWORTH, B.A.Sc., Professor of Chemistry, O. A. C., Guelph.*

"Warming and Ventilating Stables," lecture and discussion one hour; "The Farmers' Potato Crop," the Varieties, the Soils adapted to the Cultivation, the Methods of Cultivation, and the Manures, lecture and discussion fifty minutes; "Maintaining Soil Fertility," lecture and discussion one hour; "Milk in relation to the Production of Cheese," lecture and discussion one hour. Evening subjects, "The Farmer as a Member of Society," lecture forty minutes; "The Ontario Agricultural College," lecture thirty minutes.

A. H. Pettit, Grimsby.

"Spraying Experiments and the Results," "Fruit Growing in connection with the Farm." Evening subjects, "An Address Suitable to Locality," "The Ontario Agricultural College"

James McEwing, Drayton.† (Alternate with Prof. Shuttleworth.)

"Essentials to Successful Farming," "Underdraining," "Mistakes made in Farming," "The Manufacture and Management of Fertilizers on the Farm," "Farm Implements and their Care." Evening subjects, "Defects in our Educational System," "Brain Culture as a Catch Crop on the Farm."

*1.	Whitby	S. Ontario	Jan.	7th.
*2.	Oshawa	S. Ontario	"	8th.
*3.	Columbus	S. Ontario	"	9th.
*4.	Blackstock	W. Durham	"	10th.
*5.	Bethany	E. Durham	"	11th.
*6.	Millbrook	E. Durham	"	13th.
*7.	Lakefield	W. Peterborough	"	14th.
†8.	Peterborough	W. Peterborough	"	15th.
†9.	Lindsay	W. Victoria	"	16th.
†10.	Fenelon Falls	E. Victoria	"	17th.
†11.	Bobcaygeon	E. Victoria	"	18th.
†12.	Oakwood	W. Victoria	"	20th.
†13.	Beaverton	N. Ontario	"	21st.
†14.	Uxbridge	N. Ontario	"	22nd.
†15.	Unionville	E. York	"	23rd.
†16	Agincourt	E. York	"	24th.

Division VIII.

David McCrae, Guelph.

"Horse Breeding," "Cattle Feeding," "The Wool Trade," "Breeding and Feeding Sheep," "Clover Culture," "Our Best Grasses," "Rye and Rape." Evening subjects, "Country Homes," "Our Farm Life." Time from thirty minutes to one hour, including discussion

D. W. Beadle, M.A., 303 Crawford St., Toronto.

"Apple Orchard; Site, Soil, Preparation of the Ground, Selection of Trees, Planting, Cultivating and Pruning," "Varieties for Home Use, and for Foreign and Home Markets; Gathering the Fruit, Packing, and How to Market," "Injuries to Fruit Trees caused by Insects Boring into the Wood, Eating the Leaves, and Sucking the Sap; Injuries to the Fruit," "Benefits of Spraying for the Destruction of Insects, the Prevention of Diseases, and the Securing of More and Better Fruit," (Illustrated with Drawings,) "Spraying Requisites

Discussed, and Illustrated by Drawings," "Hints on the Cultivation of Pears and Plums, and the Selection of Varieties," "Small Fruits; Their Value, How to Plant and Cultivate." Evening subjects, Insects Foes and Insect Friends, with Illustrations by Magic Lantern," "Fungi injurious to the Crops of the Farmer and of the Fruit Grower, Illustrated with the Magic Lantern;" each lecture thirty minutes.

J. J. Ferguson, B.S.A., Smith's Falls.

"Building up a Serviceable Dairy Herd," lecture forty-five minutes, discussion fifteen minutes; "Some Practical and Profitable Advances in Dairying," lecture thirty minutes, discussion ten minutes; "Fodder Corn, its Value, and Methods of Handling it," lecture forty minutes, discussion twenty minutes; "Selection and Care of the Dairy Cow," lecture forty-five minutes discussion fifteen minutes; "The Farmer's Cow," lecture, thirty-five minutes, discussion, ten minutes. Evening subjects, "The Necessity of Agricultural Education," lecture thirty minutes; "Theory and Practice," lecture thirty minutes; "The Farmers' Position, Present and Prospective," lecture thirty minutes; "The Ontario Agricultural College," lecture thirty minutes.

1.	Bowmanville	W. Durham	Jan.	7th.
2.	Orono	W. Durham	"	8th.
3.	Baltimore	W. Northumberland	"	9th.
4.	Roseneath	W. Northumberland	"	10th.
5.	Trenton	W. Hastings	"	11th.
6.	Frankford	W. Hastings	"	13th.
7.	Bloomfield	Prince Edward	"	14th.
8.	Demorestville	Prince Edward	"	15th.
9.	Shannonville	E. Hastings	"	16th.
10.	Stirling	N. Hastings	"	17th.
11.	Madoc	N. Hastings	"	18th.
12.	Tweed	E. Hastings	"	20th.
13.	Norwood	E. Peterborough	"	21st.
14.	Warkworth	E. Northumberland	"	22nd and 23rd.
15.	Keene	E. Peterborough	"	24th.

Division IX.

C. A. Zavitz, B.S.A., Experimentalist, O. A. C., Guelph.

"The Science and the Practice of Underdraining," lecture twenty-five minutes, discussion twenty-five minutes; "Practical Methods for Improving the Fertility of Our Farms," lecture twenty-five minutes, discussion twenty-five minutes; "Improvement of the Plants of the Farm," lecture twenty-five minutes, discussion twenty-five minutes; "The Importance of Fodder Crops in the Production of Meat and Milk," lecture and discussion one hour; "The Cultivation of Corn, Potatoes, and Field Roots," lecture and discussion one hour; "The Best Varieties of Wheat, Barley, Peas and Oats in Seven Years Experiments," lecture and discussion one hour. Evening subjects, "The Influence of the Ontario Agricultural College," lecture thirty minutes; "Co-operative Experiments in Agriculture throughout Ontario for Ten Years," lecture thirty minutes.

T. H. Mason, Straffordville.

"Hog Raising," lecture twenty-five minutes, discussion twenty-five minutes; "Butter-making," lecture and discussion forty-five minutes; "The Care and Food of Dairy Cattle," lecture and discussion forty-five minutes; "Shall Sheep Raising be Abandoned in Ontario," lecture and discussion forty-five minutes. Evening subjects, "The Outlook for the Ontario Farmer," "Butter-making."

1.	Harrowsmith	Frontenac	Jan.	7th.
2.	Kingston	Frontenac		8th.
3.	Lansdowne	S. Leeds	'	9th.
4.	Mallorytown	Brockville	"	10th.
5.	Lyn	Brockville	"	11th.
6.	Delta	S. Leeds	"	14th.
7.	North Augusta	S. Grenville	"	15th.
8.	Spencerville	S. Grenville	"	16th.
9.	Morrisburg	Dundas	"	17th and 18th.
10.	Cornwall Centre	Cornwall	"	20th.
11.	Williamstown	Glengarry	"	21st.
12.	North Lancaster	Glengarry	"	22nd.
13.	Vankleek Hill	Prescott	"	23rd and 24th.
14.	Moose Creek	Stormont	"	25th.
15.	Odessa	Lennox	"	28th.
16.	Newburg	Addington	"	29th.
17.	Centreville	Addington	"	30th.
18.	Napanee	Lennox	"	31st.

DIVISION X.

H. H. Dean, B. S. A., Professor of Dairy Husbandry, O. A. C., Guelph.

"The Dairy Cow, How to Know Her, and How to Get Her," "Feed and Care of the Dairy Herd," "Care of Milk for Cheese Factory and Creamery," "The Cream Separator," "How to Divide Money among Patrons of Creameries and Cheese Factories Equitably," "The Value of Dairy By-Products, Whey, Buttermilk and Skim-Milk." Evening subjects, "Farm Butter-making," "Food Economy in the

Home," " Dairying in Europe," " Some Needs of the Dairy Markets and How to Fill Them," "The Ontario Agricultural College." The time for each lecture will be thirty minutes; discussion twenty minutes.

David McCrae, Guelph.

" Horse Breeding," " Cattle Feeding," " The Wool Trade," " Breeding and Feeding Sheep," "Clover Culture," "Our Best Grasses," "Rye and Rape." Evening subjects, "Country Homes," " Our Farm Life." Time from thirty minutes to one hour, including discussion.

1.	Perth	S. Lanark	Dec.	2nd.
2.	Smith's Falls	S Lanark	"	3rd.
3.	Merrickville	N. Grenville	"	4th and 5th,
4.	North Gower	Carleton	"	6th.
5.	Manotick	Carleton	"	7th.
6.	Metcalfe	Russell	"	9th and 10th.
7.	Almonte	N. Lanark	"	11th.
8.	Pakenham	N. Lanark	"	12th.
9.	Renfrew	S. Renfrew	"	13th and 14th.
10.	Cobden	N. Renfrew	"	16th.
11.	Westmeath	N. Renfrew	"	17th.
12.	Stella	Amherst Island	"	19th.
13.	Emerald	Amherst Island	"	20th.

DIVISION XI.

I. W. Steinhoff, Stratford.

" Selecting and Feeding Dairy Cows for Profit," address and discussion, one hour; " Advantages of Cheese and Butter-making as a Branch of Farming," address and discussion, forty minutes; " Confidence and Co-operation between Factory Managers and Patrons a Necessity," address and discussion, forty minutes; " Country Roads," address and discussion forty minutes; "The Quality of Cheese made from Milk paid for according to Quality *versus* The Pooling System," address fifteen minutes, discussion to follow; " Boxing and Marketing Cheese," address and discussion, thirty minutes; "Our Markets for Dairy Goods, and Our Competition," address and discussion, forty minutes; "The Flavor of Cheese where the Whey is Returned in the Cans *versus* where it is Fed at the Factory," address and discussion, thirty minutes. Evening subjects, " Butter-making on the Farm and in the Factory," "The Important Work of Farmers' Wives and Daughters in Making and Maintaining the Reputation of our Dairy Goods and Canadian Homes," " The Benefit of the Babcock Milk Tester in Cheese Factories and Private Dairies."

A. P. Ketchen, Brucefield.

"Keeping Hogs for Profit," paper twenty minutes, discussion thirty minutes; "Culture of Field Roots and Potatoes," paper fifteen minutes, discussion twenty minutes; "Keeping up Fertility," paper fifteen minutes, discussion twenty minutes; "Feeding Cattle," paper twenty minutes, discussion twenty-five minutes. Evening subjects, "Making the Most of Ourselves," twenty-five minutes; "Why I am a Farmer," fifteen minutes.

1.	Bracebridge	Muskoka	Jan.	7th.
2.	Port Carling	Muskoka	"	8th.
3.	Utterson	Muskoka	"	9th.
4.	Aspdin	Muskoka	"	10th.
5.	Emsdale	E. Parry Sound	"	13th.
6.	S. S. No. 2, Foley	W. Parry Sound	"	14th.
7.	Parry Sound	W. Parry Sound	"	15th.
8.	Hemlock	W. Parry Sound	"	16th.
9.	McKellar	W. Parry Sound	"	17th.
10.	Dunchurch	W. Parry Sound	"	18th.
11.	Magnetawan	E. Parry Sound	"	20th.
12.	Burk's Falls	E. Parry Sound	"	21st.
13.	Sundridge	E. Parry Sound	"	22nd.
14.	Powassan	E. Parry Sound	"	23rd.
15.	Sault Ste. Marie	C. Algoma	"	25th.
16.	S. S. No. 1, Laird, and McLennan,	C. Algoma	"	27th.
17.	Richard's Landing	St. Joseph Island	"	28th.
18.	Marksville	St. Joseph Island	"	29th.
19.	Thessalon	E. Algoma	"	30th.
20.	Sowerby	E. Algoma	"	31st.
21.	Iron Bridge	E. Algoma	Feb.	1st.

22. Manitoulin Island, Gore Bay, Long Bay, Mindemoya, Kagawong, Green Bay, Little Current, Tehkummah, Manitowaning, Sheguiandah, from February 3rd until completed.

SUPPLEMENTARY MEETINGS.

(For subjects of lectures and discussions see "Regular Meetings" and "List of Available Speakers," pp. 6 and 22.)

Division I.

David McCrae, J. B. Muir and T. C. Douglas.*

1.	Millbank	N. Perth	Feb. 11th.
2.	Atwood	N. Perth	" 12th.
3.	Bluevale	E. Huron	" 13th.
4.	Gorrie	E. Huron	" 14th.
5.	Clifford	W. Wellington	" 15th.
6.	Chesley	C. Bruce	" 17th.
7.	Desboro'	N. Grey	" 18th.
8.	Kilsyth	N. Grey	" 19th.
9.	St. Vincent	N. Grey	" 20th.
10.	Kemble	N. Grey	" 21st.
11.	Annan	N. Grey	" 24th.
12.	Bognor	N. Grey	" 25th.
13.	Walter's Falls	C. Grey	" 26th.
14.	Maxwell	C. Grey	" 27th.
15.	Grand Valley	Dufferin	" 28th.
16.	Belwood	C. Wellington	" 29th.
*17.	Cumnock	C. Wellington	March 2nd.
*18.	Kenilworth	E. Wellington	" 3rd.
*19.	Mount Forest	E. Wellington	" 4th.
*20.	Palmerston	W. Wellington	" 5th.
*21.	Glen Allan	W. Wellington	" 6th.

Division II.

T. G. Raynor, Andrew Elliot* and R. S. Stephenson.†

*1.	Granton	N. Middlesex	Feb. 4th.
*2.	Ailsa Craig	N. Middlesex	" 5th.
*3.	Beechwood	N. Middlesex	" 6th.
*4.	Lobo	N. Middlesex	" 7th.
*5.	Adelaide	N. Middlesex	" 8th.
*6.	Sarnia	W. Lambton	" 10th.
*7.	Oil Springs	W. Lambton	" 11th.
*8.	Courtright	W. Lambton	" 12th.
*9.	Sombra	W. Lambton	" 13th.

*10.	Wilkesport	W. Lambton	Feb.	14th.
*11.	Rutherford	W. Lambton	“	15th.
*12.	Oroton	E. Kent	“	17th.
†13.	Appin	W. Middlesex	“	18th.
†14.	Mount Brydges	W. Middlesex	“	19th.
†15.	Lambeth	E. Middlesex	“	20th
†16.	St. John's	E. Middlesex	“	21st.
†17.	Bryanston	E Middlesex	“	22nd.
†18.	Harrietsville	E. Middlesex	“	24th.
†19.	Woodstock	N. Oxford	“	25th.
†20.	Oxford Centre	S. Oxford	“	26th.

DIVISION III.

A. McNeill and J. B. Ewing.

1.	Amherstburg	S. Essex	Feb.	4th.
2.	Kingsville	S. Essex	“	5th.
3.	Leamington	S. Essex	“	6th.
4.	Ruscom	N. Essex	“	7th.
5.	Blenheim	E. Kent	“	8th.
6.	Ridgetown	E. Kent	“	10th.
7.	Mount Elgin	S. Oxford	“	11th.
8.	Otterville	S. Oxford	“	12th.
9.	Courtland	N. Norfolk	“	13th.
10.	Walsingham Centre.	S. Norfolk	“	14th.
11.	Walsh	S. Norfolk	“	15th.
12.	Bealton	N. Norfolk	“	17th.
13.	Crowland	Welland	“	18th.
14.	Stevensville	Welland	“	19th.
15.	North Pelham	Monck	“	20th.
16.	Kohler	Haldimand	“	21st.
17.	Bullock's Corners	N. Wentworth	“	22nd.
18.	Rockton	N. Wentworth	“	24th.
19.	Mill grove	N. Wentworth	“	25th.

DIVISION IV.

R. Thompson and Albin Rawlings.

1.	Galt	S. Waterloo	Feb.	4th.
2.	Ayr	S. Waterloo	“	5th.
3.	Roseville	S. Waterloo.	“	6th.
4.	Strasburg	S. Waterloo	“	7th.
5.	New Dundee	S. Waterloo	“	8th.
6.	Haysville	S. Waterloo	“	10th.
7.	Drumbo	N. Oxford	“	11th.
8.	Brookville	Halton	“	12th.

Division V.

Thos. McMillan, W. W. Hillborn and A. O. Hallman.*

1.	Islington	W. York	Feb.	4th.
2.	Beeton	S. Simcoe	“	5th.
3.	Glen Huron	W. Simcoe	“	6th.
4.	Nottawa	W. Simcoe	“	7th.

5. The delegates will reach Barrie at 8.55 a.m. on February 8th. From the 8th to the 12th, inclusive, meetings will be held at Tompkins' School House, Severn Bridge, Rugby, Oro Station, Jarrett's Corners, Medonte Town Hall, and Vasey.

*6.	Wyevale	C. Simcoe	Feb.	13th.
*7.	Crossland	C. Simcoe	“	14th.
*8.	Minessing	C. Simcoe	“	15th.
*9.	Bond Head	S. Simcoe	“	17th.
*10.	Newmarket	N. York	“	18th.
*11.	Kettleby	N. York	“	19th.
*12.	Maple	W. York	“	20th.

Division VI.

Prof. Geo. Harcourt, D. W. Beadle, M.A., and W. J. Haycraft.*

1.	Haliburton	E. Victoria	Feb.	4th.
2.	Minden	E. Victoria	“	5th.
3.	Kinmount	E. Victoria	“	6th.
4.	Coboconk	E. Victoria	“	7th.
5.	Uptergrove	N. Ontario	“	8th.
6.	Brechin	N. Ontario	“	10th.
7.	Cannington	N. Ontario	“	11th.
8.	Zephyr	N. Ontario	“	13th.
9.	Wexford	E. York	“	14th.
*10.	Malvern	E. York	“	15th.
*11.	Claremont	S. Ontario	“	17th.
*12.	Myrtle	S. Ontario	“	18th.
*13.	Port Perry	S. Ontario	“	19th.
*14.	Orono	W. Durham	“	20th.
*15.	Tyrone	W. Durham	“	21st.
*16.	Solina	W. Durham	“	22nd.
*17.	Pickering	S. Ontario	“	24th.
*18.	Cherrywood	S. Ontario	“	25th.

Division VII.

L. Patton, A. W. Peart, B.A., and Herbert J. Page.

1.	Harwood	W. Northumberland.	Feb.	4th.
2.	Grafton	W. Northumberland.	“	5th.
3.	Castleton	E. Northumberland.	“	6th.
4.	Brighton	E. Northumberland.	“	7th.
5.	Wooler	E. Northumberland.	“	8th.
6.	Wallbridge	W. Hastings	“	10th.
7.	Plainville	E. Hastings	“	11th.
8.	Consecon	Prince Edward	“	12th.
9.	Ameliasburg	Prince Edward	“	13th.
10.	Wellington	Prince Edward	“	14th.
11.	Cherry Valley	Prince Edward	“	15th.
12.	Waupoos	Prince Edward	“	17th.
13.	Deseronto	E. Hastings	“	18th.
14.	Fredericksburg	Lennox	“	19th.
15.	Roblin	Lennox	“	20th.
16.	Westwood	E. Peterborough	“	22nd.
17.	Warsaw	E. Peterborough	“	24th.
18.	Selwyn	W. Peterborough	“	25th.

Division VIII.

Alf. Brown,* I. W. Steinhoff † and Thos. A. Duff.

*1.	Athens	Brockville	Feb.	11th.
*2.	New Dublin	Brockville	“	12th.
*3.	Centre Augusta	S. Grenville	“	13th.
*4.	Osnabruck	Stormont	“	14th.
*5.	Cornwall	Cornwall	“	15th.
†6.	Martintown	Glengarry	“	17th.
†7.	Greenfield	Glengarry	“	18th.
†8.	Iniglies	Glengarry	“	19th.
†9.	Maxwell	Glengarry	“	20th.
†10.	Morewood	Dundas	“	21st.
†11.	South Mountain	Dundas	“	22nd.
†12.	Kemptville	N. Grenville	“	24th.
†13.	Oxford Mills	N. Grenville	“	25th.
†14.	Easton's Corners	N. Grenville	“	26th.
†15.	Carleton Place	N. Lanark	“	27th.
†16.	Middleville	N. Lanark	“	28th.
†17.	Lanark	N. Lanark	“	29th.
†18.	McDonald's Corners	N. Lanark	March	2nd.

Dates of supplementary meetings to be held in Prescott and other counties not included in this bulletin, will be announced at a later date.

LIST OF AVAILABLE SPEAKERS.

Many institute officers have, in the past, complained of the difficulty they have experienced in obtaining the services of suitable persons to read papers, deliver addresses, or lead in the discussions at meetings of farmers' institutes. To overcome this difficulty, the officers of institutes, regular delegates, the executive of each society chartered under the Agriculture and Arts Act, and other reliable parties were requested to prepare and submit a list of experts and specialists capable and willing to take part in this work.

The names sent in reply have been alphabetically arranged, and opposite the name is given the electoral district in which the person resides. Beneath each name is a list of subjects, and in most cases the period during which said speaker is available.

The time required to deliver each address will vary from fifteen to thirty minutes, according to the requirements of the programme.

The discussion following each address should vary from ten to forty minutes. Full discussion should always be encouraged.

Institute officers may obtain the services of any of these speakers within the indicated time by applying directly to the individual. A month's notice should be given a speaker in every case, to allow him or her sufficient time for preparation. When engaging a speaker, always indicate the subject you wish discussed.

Unless otherwise arranged between the officers and the speaker, institutes employing any of the above mentioned speakers will be required to pay his or her travelling expenses from the time the person leaves home until he or she returns thereto, together with a fee of $2.50 per day for a corresponding period, Sundays excepted.

Persons whose names are found on previous pages are also available on the same terms, when not engaged as regular delegates.

ARKELL, HENRY, Teeswater. (E. Bruce.):
"Sheep Husbandry," "Cattle Feeding," "Management and Application of Manure." Evening subjects: "Root Culture," "Farming Past and Present."
Available any time.

ARNOLD, JNO. B., Easton's Corners. (N. Grenville.):
"Breeding and Feeding a Dairy Cow," "Corn and the Silo."
Available any time.

BEAM, J. F., Black Creek. (Welland.):
"Dairy Farming," "Our Roads and How to Improve Them," "Special *versus* Mixed Farming," "Dehorning," "Winter Care of Live Stock."
Available any time.

Brown, Alf., Picton. (Prince Edward.):
"Growing Clover," "Sheep Breeding," "The Farmer's Garden," "Poultry on the Farm," "How to Obtain a Business Education at Home."
Available any time.

Chambers, A., Monkton. (Perth.):
"How to Improve Dairy Products," "Selection and Care of a Dairy Herd," "Butter-making on the Farm," "The Dairy," "The Benefit of Co-operation," "Marketing Dairy Products."
Available January 1st to April 1st.

Cook, John H., Gordonville. (N. Wellington.):
"Rearing Calves," "Lessons Taught by Experience," "Agricultural Education."
Available in January.

Chambers, J. N., Woodstock. (S. Oxford.):
"The Care of a Dairy Cow," "Winter Dairying," "The Value of Ensilage, and How to Grow it and Store it," "The Creamery in Winter," "The Injustice of Pooling Milk." Evening subjects: "Farming," "The Importance of Business Methods."
Available any time.

Cleland, Robert, Listowel. (N. Perth.):
"Dairy Farming," "Breeding and Feeding Dairy Stock," "Rotation of Crops," "Care of Manure."
Available any time after February 1st, 1896.

Curtiss, H., Warkworth. (E. Northumberland.):
"Poultry on the Farm," "Winter Poultry Shows," "Swine Breeding," "Why Young Men Leave the Farm," "Grain Growing," "The Farmer's Garden," "Horse Breeding," "Bee-keeping."
Available any time.

Davidson, J. Fred., Peterborough. (W. Peterborough.):
"Growing Field Roots and their Value on the Farm," "Care and Management of Live Stock," "Cultivation of the Soil." Evening subjects: "The Value of Appearances," "Life on a Farm, the Advantages thereof."
Available any time after January 15th, 1896.

Davidson, Albert, Glandine. (S. Victoria.):
"Horse Breeding," "What Prevents Prosperity," "Social Life on the Farm," "Ownership of Land."
Available any time.

Dunbar, Henry, Ospringe. (S. Wellington.):
"Farming as an Occupation," "Rotation of Crops," "The Advantages to Farmers of Computing Statute Labor."
Available any time.

Drury, Hon. Chas., Barrie. (N. Simcoe.):
"Breeding and Feeding Beef Cattle," "Underdraining and Benefits therefrom," "Defective Methods in Farming." Evening subjects: "Farming as an Occupation."

Dearness, J., London. (Middlesex.):
"Friends and Foes Among the Fungi," "Weeds, especially Recent Ones," "Education of Farmers' Children."
Available any time.

Dickson, Wm., Atwood. (N. Perth.):
"Dairy Farming and Cheese Production," "Rotation and Management of Farm Crops," "Draining," "Cultivation of Roots," "Constructing and Maintaining Roads."
Available any time after January 1st.

Douglas, T. C., Galt. (S. Waterloo.):
"Fall and Winter Care of Breeding Ewes," "Care and Management of Manure," "Growing Roots," "Care and Feeding of Stock."
Available any time, but from January 15th to the end of February most suitable.

Duff, Thos. A., Toronto:
"Poultry in its Relation to the Farm," "Method of Caring for, Feeding and Housing Poultry," "Manner of Collecting, Saving and Packing Eggs for Shipment, and Means of Obtaining the Best Profit therefrom," "Best Market for Eggs," "The Possibilities and Future of the Poultry Industry."
Available any time.

Evertts, M. K., Easton's Corners. (N. Grenville.):
"The Future of the Cheese Industry," "The Branding and Dating of Cheese."
Available any time.

Evertts, Milton, Easton's Corners. (N. Grenville.):
"Feeding and Care of a Dairy Cow," "The Care of Milk," "The Relation of the Patron to the Cheese Maker," "The Work done by the Inspectors."
Available any time.

Ewing, J. B., Dartford. (E. Northumberland.):
"Care and Management of Swine," "Care and Management of Sheep," "The Brood Mare," "Corn Culture," "Clover Culture," "Winter Dairying." Evening subjects: "Why Boys Leave the Farm," "Farmers' Organizations from an Educational Standpoint."
Available December to April.

Elliot, Andrew, Galt. (S. Waterloo.):

"The Necessity of a Silo," "Building a Silo," "Growing Corn for Ensilage," "Filling the Silo," "Feeding Ensilage," "Turnips in Stock Feeding," "Growing and Storing Turnips," "Benefits of Dehorning," "Soiling Dairy Cows," "Should we Increase our Flocks," "The Breeding of Ram and Ewe," "Feeding Lambs for Export," "Sheep *versus* Dogs," "Hog Breeding and Feeding." Evening subjects: "Who will be the Future Farmer of Canada, and what his Condition."

Available December to April.

Ficht, V., Oriel. (S. Oxford.):

"Cultivation of the Soil for Grain, for Roots and for Corn," "Breeding and Care of Sheep," "Cattle Breeding," "General Farming *versus* Special Farming," "Advice to Young Men."

Available any time.

Frith, J. E, Princeton. (N. Brant.):

"Rearing Young Pigs," "Specialties on the Farm," "Poultry on the Farm," "Beekeeping on the Farm."

Available any time.

Frazer, John Z, Burford. (S. Brant.):

"Cultivation of the Soil," "Clover and its Uses," "Eradication of Weeds," "The Farmer's Garden," "The Future of Wheat Growing." Evening subjects: "A Talk to Young Farmers," "Glimpses of the Great Fair."

Available any time.

Findlay, Jas. H., Bright. (N. Oxford.):

"Butter-making," "The Babcock Tester," "Care of Milk," "Winter Dairying," "Notes on Cheese Making."

Available any time.

Graham, J. I., Vandeleur. (S. Grey.):

"Care of an Orchard," "Pruning," "Spraying," "Picking, Packing and Shipping Fruit."

Available any time for short periods.

Gould, Jos. E., Uxbridge. (N. Ontario.):

"The Value of Ensilage," "Cultivation of Corn," "How to Construct a Cheap Silo," "Feeding and Care of Dairy Cows," "Why one Farmer Succeeds and another does not, though Surrounded by Similar Conditions."

Available any time.

Gibbard, W. T., Napanee. (Lennox.):

"Rearing Poultry."

Available any time.

Howard, S., Powassan. (Muskoka.):

"Selection and Care of Dairy Cows," "Production and Care of Milk," "The Hog as an Adjunct to the Dairy." Evening subjects: "The Benefit Derived from Co-operative Dairying," "Marketing Dairy Products," "The Dairyman as a Manufacturer."

Available December to April.

Hallman, A. C., New Dundee. (S. Waterloo.):

"Corn Growing and the Silo," "Breeding Dairy Cattle," "Rearing and Feeding Calves intended for Dairy Purposes," "The Brood Sow and her Offspring."

Available any time.

Houston, Wm., M.A., 66 St. Mary Street, Toronto. Superintendent of Teachers' Institutes:

"Agriculture in the Public School," "Forestry in Relation to Agriculture." Evening subjects: "Home Life on the Farm," "Reading for Recreation."

Available from Dec. 1st to Jan. 15th, and Feb. 15th to April 30th.

Hanmer, D. G., Mount Vernon. (S. Brant.):

"How to Establish a Flock," "Mistakes in Stock Breeding," "The Horse Industry," "Preparing the Soil for Wheat," "The Farm Home."

Available any time.

Honey, Richard, Warkworth. (E. Northumberland.):

"Selection and Care of a Stock Ram," "Selection and Care of a Brood Sow," "Management and Care of Young Pigs," "Evils Resulting from Inbreeding." Evening subjects: "Economical Feeding of Cows," "The Value of the Farmers' Institutes," "Turnip Culture."

Available any time.

Hope, John, Palermo. (Halton.):

"Care and Feeding of Dairy Cattle," "Culture and Curing of Fodder Corn." Evening subjects: "How to Keep the Boys on the Farm," "The Farmer's Wife," "The Farmer's Home."

Available any time.

Hunter, Samuel, Rockton. (N. Wentworth.):

"How to Manage a Dairy Farm in Ontario and Make it Pay," "The Winter Care of Dairy Cattle," "The Crops a Dairy Farmer should Grow and how Grow them," "Growing Corn," "Making and Marketing Dairy Butter," "Underdraining," "Building a Silo," "The Farmer's Fruit Garden," "Road Making," "The Advantage of Using a Centrifugal Machine in Dairy Work."

Available any time.

Haycraft, W. J., Agincourt. (E. York.) :
"Poultry on the Farm," "Breeding and Managing Swine," "Selection and Care of a Dairy Cow," "Cultivation of Field Roots," "Care of Farm Implements."
Available any time.

Hillborn, W. W., Leamington. (S. Essex.) :
"Underdraining," "The Farmer's Garden," "Cultivation of the Orchard," "Destroying Injurious Insects and Fungi in the Orchard." Evening subjects : "Small Fruits," "The Farmer's Garden," "House Plants."
Available any time.

Holtermann, R. F., Brantford. (S. Brant.) :
"The Advantages of Beekeeping on the Farm," "The Advantages of Beekeeping in a New Country," "How to Succeed as an Apiarist," "Bees in Relation to Plant Life," "The Wonders of the Honey Bee," "Poultry on the Farm," "The Ontario Agricultural College."
Available any time.

Jackson, **John**, Abingdon. (S. Wentworth.) :
"How to Establish a Flock," "Summer Care of a Flock," "Winter Care of a Flock," "The Selection of a Stock Ram," "Preparing a Flock for the Show Ring."
Available any time.

Jarvis, L. G., Manager and Lecturer, Poultry Department, O. A. C. Guelph :
"The Care and Management of Poultry," "Food," "Proper Method of Feeding," "Poultry Houses," "Care of Eggs,' "Dressing Poultry," "Marketing Poultry," "Marketing Eggs," "Poultry at the Ontario Agricultural College."
Available any time.

Lockhead, **Wm.**, B.A., M.S., Napanee. (Lennox.) :
"Insects Injurious to Farm and Garden Crops and How to Destroy Them," "Insects Beneficial to Farm and Garden Crops," "Weeds." Each of these addresses will be illustrated with specimens of insects and plants.
Available during Christmas and Easter holidays.

Leavens, **Wm.** B., Chisholm. (Prince Edward.) :
"Grafting Fruit Trees," "Planting an Orchard," "Care of an Orchard," "The Farm House."
Available any time, for short periods.

Lancaster, **John**, Westwood. (E. Peterborough.) :
"The Advantages of Draining," "How to Drain," illustrated, "Why Farming Does Not Pay,' "How to Keep the Girls and Boys on the Farm," "The Farmer's Home."
Available any time.

Lick, Elmer, Oshawa. (S. Ontario.):

"How to Control the Moisture in the Soil," "Feeding Dairy Cattle," "The Silo," "Corn and Clover the Best Crops for the Stock Raiser," "Growing Apples." Evening subjects: "Agricultural Education," "Co-operation Among Farmers," "The Institute System."

Available Dec. 15th, to Jan. 1st, and from February 10th, to March 1st.

Legg, John, St. Marys. (S. Perth.):

"Rotation of Crops," "The Cultivation and Care of the Soil," "Draining," "Subsoiling," "Cultivation and Value of Roots," "Cultivation of Corn," "Temporary and Permanent Pastures," "Breeding and Care of Farm Stock," "Sheep Breeding and Their Value on the Farm," "The Orchard."

Available any time.

Marsh G. F., B.S.A., Thornbury. (E. Grey.):

"Dehorning," "Growing Corn," "The Silo," "The Care of an Orchard," "Drainage," "The Ontario Agricultural College," "Breeding Swine," "Winter Dairying."

Available any time.

Morrison, John C., Winthrop. (E. Huron.):

"Food and Care of the Cow," "Farming for Profit," "Rotation of Crops," "Care of Live Stock," "Why Young Men Should Remain on the Farm," "Feeding Hogs," "Road Making," "Tree Planting and Pruning," "Co-operative Dairying," "The Babcock Test."

Available any time except the 16th and 30th of December, and the 6th and 20th of January.

Munro, Jas. G., Embro. (N. Oxford.):

"Leakages on the Farm," ' Poultry on the Farm," "Cultivation of Roots," "How to Maintain the Interest at Farmers' Institutes," "Dehorning," "The Beautifying of Public Highways," "Our Farm Home," "Our Highways."

Available any time.

Morden, E., Niagara Falls South. (Welland.):

"Profitable Fruit Culture," "Small Fruits for Profit," "Currants, Varieties and Culture," "Raspberry Culture," "Best Market Varieties of Fruit," "The Farmer's Fruit Garden," "The Common Insects Injurious to Fruits," "Will the Coming Farmers Study Science," "Our Public Roads." Evening Subjects: "How to Beautify Our Farms," "How to Arrange Lawns," "Best Hardy Shrubs and Evergreens," "Wind Break for Use and Beauty."

Available any time.

Muir, J. B., North Bruce. (W. Bruce.):
"Feeding Hogs," "Care and Food of a Dairy Cow," "Buttermaking in the Home Dairy," "The Care of Milk," "Saving and Applying Manure," "Underdraining." Evening subjects: "Making Farm Life Pleasant."
Available any time.

Mole, Dr. W., M.R.C.V.S., 260 Adelaide St., Toronto.
"Milk Fever and Mammitis," "Inflammation and its Terminations," "Micro-Organisms and Disease," "Origin of the Horse," "Diseases of Sheep," "Use of Salt for Flocks," "Hog Cholera."
Available any time.

Moyer, M., 406 Spadina Ave., Toronto.
"Preparing Butter for the City Market."
Available for a day or two at any time.

McMillan, John, M.P., Seaforth. (S. Huron.):
"Cultivation of Corn," "Preparing Corn for the Silo," "Cultivation of the Soil for Roots or Grain Crops," "Farmers' Institutes," "Underdraining," "Care of the Manure Heap," "How to Apply Manure to the Land," "Breeding, Feeding, and Exporting Beef Cattle to Britain," "The Benefits of Dehorning," "The Breeding and Care of Heavy Draught Horses," "Farm Implements," "Make Home Attractive," "Why Boys Leave the Farm."

McMillan, Robert J., Seaforth. (S. Huron.):
"Underdraining," "Manuring," "Growing Corn for the Silo," "Feeding Cattle for the British Market," "Preparing the Soil for a Seed Bed," "Green Manuring," "Dairying." Evening subjects: "Farming as an Occupation," "Why Young Men Leave the Farm," "The Farmer as a Business Man."
Available after January 1st.

McNish, W. H., Lyn. (Brockville.):
"Breeding Dairy Stock," "Raising Calves in Dairy Districts for Dairy Purposes," "Care and Training of Dairy Cows," "Breeding and Feeding Pigs for Market," "Making and Marketing Dairy Butter," "Suitable Crops for a Dairy Farm," "How to Make Farming More Profitable."
Available any time.

Nicholson, Stephen, Sylvan. (N. Middlesex.):
"Crumbs Swept Up," "The Ox from Birth to Block," "Applying Manure," "Soiling and Soiling Crops." Evening subjects: "Agricultural Education," "Plant Life."
Available after January 1st.

Nicklin, Chas., Ponsonby. (C. Wellington.):
"Improving Impoverished Farms," "Make Country Homes Attractive," "Farming as a Calling," "Self Improvement," "What Shall we do with Our Farms."
Available any time.

Peart, A. W., B.A., Burlington. (Halton.):
"Underdraining," "Apple and Grape Culture," "Fertilization of Fruit Blossoms," "A Few of the Fungi and Insects that Injure our Larger Fruits." Evening subjects: "Leaks on the Farm," "Agricultural Education."
Available any time.

Page, Herbert J., St. Marys. (S. Perth.):
"Poultry for Profit," "Selection of Poultry for the Farm Yard," "Management of Poultry on the Farm," "The Incubator," "The Brooder," "Poultry as Destroyers of Insects."
Available any time.

Pattullo, Andrew, Woodstock. (S. Oxford.):
"Good Roads and the Canadian Farmer," "The Relation of Good Roads to Drainage," "Good Roads and Patriotism."
Available for a few days occasionally.

Payne, G. Y., Peterborough. (W. Peterborough.):
"Breeding and Care of Hogs," "Ensilage and the Silo," "The Value of Clover," "Science in Agriculture," "The Ontario Agricultural College."
Available any time.

Potter, R. J, Mono Mills. (Cardwell.):
"How to Make Co-operative Dairying Successful," "The Lines that Pay in General Farming," "How to Grow and Store Cheap Fodders," "The Silo, Method of Construction and Cost," "The Value of the Babcock Tester on the Farm."
Available any time.

Race, T. H., Mitchell, (N. Perth.):
"The Importance of the Orchard in Mixed Farming," "Mistakes and Humbugs in Horticulture that Should be Avoided." Evening subjects: "The History of Agriculture; an Ancient and Modern Industry," "The Farmer's Fruit Garden," "Home Surroundings," "Beautifying the Home and Making Farm Life Attractive," "Agricultural Education."
Available any time after January 15th.

Rawlings, Albin, Forest. (W. Lambton.):
"Growing Corn," "Growing Clover and Grasses," "Root Growing," "How to Make Money Farming," "When to Buy Cattle and When to Sell Them." "Winter Care of Beef Cattle," "Summer Care of Beef Cattle."
Available January and February.

Rowand, James, M.P., Dumblane. (W. Bruce.):
"Breeding and Raising Stock, Principally Cattle," "Production of Food for Feeding and Fattening Cattle at the Smallest Cost," "General Farming."

Reynolds, A. J., Danforth. (E. York,):
"Weeds," "Cultivation of the Soil," "The Silo and Ensilage," "Growing Roots," "Growing Potatoes," "The Best Varieties of Grain," "Boys on the Farm."
Available any time.

Smith, J. L., Whitby. (S. Ontario):
"Mixed Farming," "Growing Clover for Feed and Seed."
Available any time.

Scott, Thos. B., Vanneck. (E. Middlesex):
"How to Keep up the Fertility of the Soil," "Manures, Barn Yard and Commercial," "The Three Great Cleaning Crops, Clover, Wheat, and Corn," "The Coming Hog," "Sixteen Years with a Silo."
Available any time.

Sleightholm, J. A. B., B.S.A., Humber. (W. York):
"Stabling and Soiling Stock During the Summer Months," "Winter Care of Stock," "Breeding and Feeding Hogs," "Marketing Farm Butter," "Trees for the Farm, including Evergreens, Nut bearing and other Deciduous Varieties," "Cultivation of the Soil," Evening subjects: "The Worthiness of Our Calling."
Available any time.

Snell, J. C. Snelgrove. (Peel):
"The Selection of a Breeding Flock," "Winter Care of Sheep," "Summer Care of Sheep," "How to Rear Large Lambs," "Rape Growing," "Mistakes Made in Breeding Animals," "How to Establish and Maintain a Herd."
Available any time.

Smith, Wm., M.P., Columbus. (S. Ontario):
"Breeding and Care of Heavy Horses," "Cultivation of Soil in Spring and Fall," "Elements of Success in Farming," "Breeding and Care of Sheep."
Available any time.

Smith, A. M., St. Catharines. (Lincoln):
"How to Make Fruit Growing Profitable," "Growing Small Fruits," "Influence of Horticulture."
Available from December to March.

STEPHENSON, R. S., Ancaster. (N. Brant):

"Breeding and Rearing Dairy Cattle," "Feeding Dairy Cows," "Selecting Dairy Cows," "How to Choose a Bull for Service in a Dairy Herd."

Available any time.

SISSONS, JONATHAN, Barrie. (N. Simcoe):

"Breeding and Management of Farm Stock," "How I Made Money on a Farm," "Agricultural Depression, Its Cause and How it May be Lessened. Evening subjects: "Home Training," "How to Improve the Farmer's Position," "Agricultural Education."

Available any time.

SLEIGHTHOLM, F. J., B.S.A., Humber. (W. York):

"The Babcock Milk Tester in the Farm Dairy," "A Dairy Herd, Its Breeding and Management," "Cattle Feeding," "Summer Feeding of Young Pigs," "Winter Feeding of Young Pigs." Evening subjects: "The Nobility of Agriculture."

SHEARER, W. C., Bright. (N. Oxford):

"The Experience of a Practical Dairyman," "Feeding Hogs," "The Value of Succulent Food for Live Stock," "How to Obtain a Profitable Dairy Herd," "The Best Varieties of Peas and Oats," "Experiments in Growing Roots," "Potato Growing."

Available for a day or two at a time at any period.

THOMPSON, J. D., Derwent. (S. Middlesex):

"Care of Farm Yard Manure," "Farm Fences," "Making Maple Sugar."

Available any time.

THOMPSON, GEO., Vyner. (W. Lambton):

"Farming as an Occupation," "The Farmer's Standing in Society," "The Advantages and Prospects of Dairying," "Large *versus* Small Farms," "The Care of Milk to be Sent to Cheese Factories"

Available December to April.

TOLTON, JAS., Walkerton. (E. Bruce):

"Mistakes in Sheep Breeding," "The Care of Breeding Ewes," "Preparing Cattle for the British Market," "Cultivation of Roots," "The Farmer's Orchard," "How to Make a Country Home Attractive."

Available December or January.

THOMPSON, R., St. Catharines. (Lincoln):

"Cultivation of the Soil," "How Cultivation Benefits the Growing Crop," "Cultivation of Fruit Trees and Small Fruits," Gathering and Marketing Fruit," "City *versus* Country Life," "Root Growing," "Corn Growing," "Pea Growing," "Swine Breeding and Feeding," "Underdraining."

Available any time.

USHER, ISAAC, Thorold. (Welland):
"Building Cement Concrete Walls for Houses, Bank Stables, Silos, etc.," "Building Cement Concrete Floors for Horse Stables, Cow Stables, and Hog Pens and Troughs," "Improved Ventilation for all Kinds of Stables," "Concrete Bridges, Culverts, and Road Repairs," "Road Making."
Available any time.

WOOD, ELIAS, Agincourt. (E. York):
"How I Succeeded as a Farmer," "Care and Management of Live Stock," "The Importance of a Good Garden on a Farm."
Available any time.

WHITE, E. F., B.S.A., Richard's Landing. (St. Joseph Island).
"The Ontario Agricultural College," "The Farmer's Education," "Value of a Rotation of Farm Crops," "Small Fruits on the Farm," "Cultivation of the Soil," "The Evil Effect of Weeds." "Management of Live Stock."

WHEATLY, T. C., Blackwell. (W. Lambton):
"The Importance of Ridding Our Farms of Weeds and How Best to Accomplish it," (illustrated), "Some of the Newer Weeds Threatening Us and How to Prevent Them Spreading," (illustrated), "The Farmer's Vegetable Garden," "Farm Accounts and How to Keep Them," "How to Beautify the Home," "The Ontario Agricultural College," "Our Native and Introduced Grasses with Specimens," (illustrated).
Available any time.

WHITE, H., Hawkesville. (N. Waterloo):
"The Hog as an Adjunct to the Dairy," "Hints to Dairymen," "Co-operative Dairying a Necessity," "Butter-making," "Finishing Hogs."
Available any time.

WRIGHT, GEO., Elora. (C. Wellington):
"My Experience with the Silo and Ensilage," "Rotation of Crops," "Underdraining," "Agricultural Experiments," "Selection and Change of Seed." Evening subjects: "Social Economy," "Value of Small Things," "Home Pleasures."
Available any time.

WIDDIFIELD, J. W., Siloam. (N. Ontario):
"The Sources of Plant Food, and How we may draw from Them, "Common Salt, Its Uses and Misuses on the Farm," "The Relation of Insect Life to Plant Life," "Principles to be Observed in Destroying Noxious Weeds," "The Economy of a Judicious Rotation," "The Assimilation of Atmospheric Nitrogen by Clover," "What We Feed For, or the Functions

of Food in the Animal Economy," "The Animals that Constitute a Profitable Dairy Herd," "Feeding and Management of Young Animals Intended for the Dairy."

Available any time.

YUILL, Jos., Carleton Place. (S. Lanark):

"Fodder Corn and Silo," "Management of Dairy Cattle," "Profits of Winter Dairying," "Points of a Dairy Cow," "Care and Application of Manure," "How to Enrich an Impoverished Farm," "Sheep Husbandry," "Swine Breeding," "Underdraining." Evening subjects: "Butter-making," "What Should We Teach Our Sons and Daughters."

Available any time.

YUILL, A. K., Carleton Place. (S. Lanark):

"Care and Management of Dairy Cattle," "Corn and the Silo," "Care and Application of Manure," "Selection and Cross Breeding of Cattle," "Underdraining," "How to Restore an Impoverished Farm. Evening subjects: "The Ontario Agricultural College," "Butter-making," "How to Make Farm Life Attractive."

Available any time.

ZAVITZ, S. P., Coldstream. (S. Middlesex):

"Apple Culture," "The Proper Treatment of Our Old Orchards to Make Them Profitable," "How to Grow an Orchard," "Apple is King, What Varieties Shall We Raise," "The Apple, Pruning, Spraying, and Marketing," "The Silo and Its Product," "The Production of Wheat." Evening subjects: "The Development of Culture and Character in Our Country Houses," "How Shall We Utilize Our Winter Evenings," "This Canada of Ours."

Available December 1st to March 1st.

LADY SPEAKERS.

LIVINGSTON, (Miss) B., Ottawa. Superintendent School of Cookery:

"The Food Value of Milk and Its Derivatives, Cooking of Milk, Cheese, and Eggs," "A Practical Lesson on Invalid Cookery," "Diet for Children," "Cereal Food and Breakfast Dishes," "The Cookery of Vegetables," "Classes and Combinations of Food," "Hot Supper Dishes."

Available any time.

MILLAR, (Miss) M., Ottawa. Demonstration Lecturer, School of Cookery:

"The Farm Kitchen," "The Five Food Principles and the Purposes they Serve in the Body." Demonstration lectures: "The Dietic Value of Milk and Cheese," with illustrations of cooking them, "The Medicinal Properties of Fruits, and Dainty

Ways of Serving Them," "Starchy Foods," examples, Puddings and Breakfast Dishes, "The Economical Cookery of Meats," "The School Children's Lunch Basket." Food prepared and cooked before the audience and served at the close of lecture.
Available any time.

Rogers, (Mrs.) M. J., Kinsale. (S. Ontario):
"The Farmer's Home and Its Surroundings," "The Influence of Home Surroundings on Young People," "The Road to Success."
Available any time.

Smith, (Mrs.) J. L., Whitby. (S. Ontario):
"Farmers' Wives and Daughters, Their Duties, Delights and Discouragements," "Young Men on the Farm, Their Chances of Success."
Available any time.

SPECIAL SPEAKERS.

The following is a list of names and addressess of persons recommended by various associations as Specialists, capable of acceptably addressing Farmers' Institute meetings.

The Ontario Bee-Keepers' Association, through their President, J. W. Hall, and their Secretary, W. Couse, recommended as Lecturers on Apiculture :

Messrs.	Allan Pringle, Selby	(Lennox)
	R. McKnight, Owen Sound	(Grey).
	R. F. Holtermann, Brantford	(Brant).
	James E. Frith, Princeton	(Oxford).
	F. A. Gemmell, Stratford	(Perth).
	S. T. Pettit, Belmont	(Middlesex).

The Ontario Fruit Growers' Association, through their President, Mr. M. Pettit, and their Secretary, Mr. L. Woolverton, recommended the following gentlemen :

Messrs.	D. W. Beadle, M. A., Toronto	(York).
	M. Pettit, Winona	(Wentworth).
	A. H. Pettit, Grimsby	(Wentworth).
	A. M. Smith, St. Catharines	(Lincoln).
	M. Burrell, St. Catharines	(Lincoln).
	E. B. Stevenson, Freeman	(Halton).
	A. W. Peart, Burlington	(Halton).

James Sheppard, Queenston ......(Lincoln).
T. H. Race, Mitchell..........(Perth).
G. C. Caston, Craighurst.........(Simcoe).
W. E. Wellington, Toronto.......(York).
E. D. Smith, Winona ...., (Wentworth).

The Ontario Creameries' Association, through Mr. Mark Sprague, Secretary, recommended:

Messrs. D. Derbyshire, Brockville........(Leeds).
R. J. Graham, Belleville.........(Hastings).
John Croil, Aultsville...........(Stormont).
A. A. Wright, Renfrew..........(Renfrew),
John A. Sprague, Demorestville ..(Prince Edward).
Mark Sprague, Ameliasburg......(Prince Edward).

The Ontario Poultry Association, through their Secretary, Mr. Thos. A. Browne, recommended:

Messrs. Thos. A. Duff, Toronto ....(York).
Herbert J. Page, St. Marys......(Perth).
Geo. Nichol, Cataraqui ....(Frontenac).

Several of the names here published will be found in the alphabetical list published under the head of Available Speakers.

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ANNUAL MEETINGS OF OTHER ASSOCIATIONS.

Association.	Place.	Date.
Eastern Dairymen's Association	Campbellford,	Jan. 8, 9 and 10.
Creameries' Association	Cornwall	Jan. 14, 15, and 16.
Western Dairymen's Association	Woodstock	Jan. 7, 8, and 9.
Poultry Association	Port Hope	Jan. 9.
Eastern Poultry Association	Ottawa	Jan. 20th to 24th.
Fruit Growers' Asscciation	Woodstock	Dec. 11, 12, and 13.
Bee-Keepers' Association	Brantford	Jan. 15, 16, and 17.
Entomological Society	London	Nov. 27, 28.
Good Roads Association	(Not yet decided).	

The Officers and Directors of Agricultural, Horticultural, Dairy, Apiary, and other kindred Societies are cordially inviten to co-operate with the Officers and Directors of the various institutes throughout the province, to the end that the meetings advertised in this bulletin may be successfully conducted. In order to facilitate such co-operation, the Secretaries of the various Associations of a provincial character are given below. A list of the Secretaries of the county and township Agricultural, Horticultural, and kindred Associations may be obtained by applying to the Department of Agriculture, Toronto.

Bee-Keepers' Association, W. Couse, Streetsville.
Dairymen's Association (Eastern), R. G. Murphy, Elgin.
Dairymen's Association (Western), J. W. Wheaton, London.
Eastern Ontario Poultry Association, F. H. Gisborne, Ottawa.
Entomological Society, W. E. Saunders, London.
Fruit Growers' Association, Linus Woolverton, Grimsby.
Ontario Creameries' Association, Marcus Sprague, Ameliasburg.
Ontario Poultry Association, T. A. Browne, London.
Horse Breeders' Association, Henry Wade, Toronto.
Cattle Breeders' Association, F, W. Hodson, O.A.C., Guelph.
Sheep Breeders' Association, F. W. Hodson, O.A.C., Guelph.
Swine Breeders' Association, F. W. Hodson, O.A.C., Guelph.
Experimental Union, R. F. Holtermann, Brantford.
Ontario Good Roads Association, K. W. McKay, St. Thomas.

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BULLETIN (Special.) MAY, 1897.

Ontario Agricultural College and Experimental Farm

PLANS OF BUILDING

AND

METHODS OF CONDUCTING

CHEESE FACTORIES AND CREAMERIES.

By H. H. Dean, B.S.A., Professor of Dairy Husbandry.

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BULLETIN (SPECIAL).

PLANS FOR BUILDING AND METHODS OF CONDUCTING CHEESE FACTORIES AND CREAMERIES.

The co-operative system of dairying is now so important to the dairymen of Ontario, and the need of good buildings and machinery so pressing, that the following hints on building and operating co-operative creameries and cheese factories are submitted with the hope that they may be found useful in securing the latest improvements in structures to be used for the manufacture of Canadian cheese and butter.

We would urge the need of having the milk made into butter at the creamery in *winter* as well as during the summer. The saving of butter from the skim-milk (averaging about 1 lb. of butter per 100 lbs. of skim-milk), and the extra price obtained for creamery butter as compared with dairy butter, will pay the expenses of manufacturing and selling at the creamery In many cases the separator creamery in winter would pay the dairies a margin of 3 to 5 cents a pound after deducting the cost of making, while the farm would be relieved of the drudgery of making butter under trying and unfavorable circumstances. Nearly every cheese factory in the Province ought to arrange to make butter for four to six months each year, and thus increase the profits of the patrons by one-third to one-half, as well as be a source of revenue to the owners of factories.

ADVANTAGES OF CO-OPERATIVE DAIRYING.

1. A better average article may be produced and also goods of more uniform quality, which will consequently bring a higher average price than private dairy goods.

It is possible to make a better quality of cheese or butter in a private dairy than in a factory, in case a person has the necessary skill and conveniences, but only under special circumstances will it pay the dairyman to employ the labor and buy the utensils required. Consequently for the mass of farmers it will be wiser to adopt the co-operative or factory plan in the manufacturing of dairy goods.

2. Butter and cheese can be produced more cheaply, because there is less outlay for labor and capital on the co operative plan than there would be if each dairyman would buy the utensils and employ the labor necessary to manufacture the milk in his own dairy. The running expenses are also less.

The object of each person engaged in the business should be to produce goods as cheaply as possible. The profits in dairying lie between the price obtained and the cost of producing and marketing. For instance if cheese sells for 10 cents per pound, and it costs 6 cents to produce and market it, a profit of 4 cents per pound is made. But if it sell for 15 cents and it costs 13 cents to produce it a profit of but 2 cents is made on each pound of cheese. *Profits do not depend merely upon getting a high price*, but in producing as cheaply as possible and then getting the highest available price for the goods.

3. Skilled labor may be employed in manufacturing. This is a day of specialities. A farmer is not expected to be an expert in growing foods, in breeding and rearing dairy stock, and also be an expert cheese or butter-maker.

4. It is possible to extend co-operative dairying to that branch of farming known as the hog industry, which is so closely allied with the dairy. Instead of hauling the whey, skim-milk and buttermilk back to the farm for feeding hogs, it will be more profitable to feed these hogs at or near the factory, where there are sufficient by-products to warrant the erection of suitable pens and the engagement of a competent person to feed and care for the animals.

5. There will be more wealth to the mass of farmers, more comfort in the home, less tired, worn out farmers' wives and daughters, who are already overworked, and lastly, if co-operative dairying is more largely adopted, there will be built up a national industry that will be a source of national pride. This last cannot be accomplished so long as private dairying takes the lead.

CHEESE FACTORY OR CREAMERY?

This question is frequently asked. Several times we have received a postal card with something like the following written upon it:

"We are thinking of starting a cheese factory or a creamery in this neighborhood. Which would you advise us to build?"

The answer to this depends upon circumstances. Of course those who ask are anxious to know which will pay them best. Judging from the experience of the Province as a whole, we should conclude that the cheese factory has paid better than the creamery, as we have more cheese factories than creameries. But there are some districts where a cheese factory can not be successfully carried on unless for a short time during the summer, and even then it is under difficulties. Sections such as parts of Wellington County, Waterloo, Huron, Bruce, a portion of Brant, parts of Simcoe and York, where beef raising has been a speciality for years—in these sections, cheese manufacturing is difficult, owing to the fact that all the milk is taken from the farm and there is none to rear steers for fattening. In such places the creamery will be found more satisfactory, as the skim-milk is either left at the farm or returned after separation at the factory.

In other localities where the population is scattered, roads are bad and the cost of transportation high, the creamery will meet with more favor than the cheese factory, and will be more profitable. It is a question that each place must decide for itself, after taking into consideration all the circumstances. A general answer would be to build cheese factories in cheese factory sections, creameries in creamery sections; and where there are neither, establish according to the local surroundings; but in any case, it would be advisable to build so that either cheese or butter may be manufactured without much additional expense, as the future of this industry is to be largely cheese in summer and butter in winter, owing chiefly to climatic conditions.

ESTABLISHING FACTORIES IN NEW PLACES.

In localities where the people know very little about the management or requirements of a cheese factory or creamery, it is a good plan to secure the services of some competent person to address a public meeting on the advantages and essentials of co-operative dairying. Seek to get the support and influence of some prominent men in the locality, as the majority are apt to wait and see what action half a dozen leading farmers are going to take. If these men support it, then nearly all are likely to fall into line. It would be well at this or some other meeting to divide the territory into say four sections, and appoint a committee of two in each section to canvass the neighborhood and find out the number of cows within a radius of five or six miles, and the number of men who will pledge the milk from their cows for a term of three or five years, if the factory is erected. After this committee reports there will be some data to proceed upon for future operations. Unless the milk from about 300 cows can be secured, or a probability of having this number in the near future, it would not be advisable to build a factory and equip it on a very extensive scale.

The next step is to select a couple of suitable men to go into cheese and butter districts and gather all the information possible in reference to feeding cows, care of milk and cream, methods of conducting the business, plans of buildings and all matters pertaining to the dairy.

The next point to decide is the

METHOD OF CONDUCTING THE FACTORY.

There are several ways of starting and conducting the business. but usually it is either what is known as "private enterprise" or the "joint stock company" plan. In the first way, some person or persons agree to build a suitable building, equip it properly, and manufacture the milk or cream at a certain rate per pound, the patrons contracting to furnish the milk from a certain number of cows for a certain number of years. In this case the private individual, running all the risks, usually charges a higher rate than the joint stock factories. For cheese the rate usually varies from one and one-half cents to two and one-half cents per pound, the patrons delivering the milk on the milk stand or at the factory—usually the former. For butter the rate varies from three to four cents per pound.

In the joint stock company method the patrons (and others also) subscribe all or a portion of the money required to build and equip the factory, thus becoming owners of the building and plant as well as of the cows. This method has several advantages, the chief of which are:

1. The shareholders, who are chiefly patrons of the factory, have an interest in its welfare, and are more likely to give it hearty support than if it is owned by some one else.

2. The patrons receive the benefit of the profits of manufacture, which may be applied in reducing the cost of manufacture to shareholders to its lowest limit, after all charges have been paid; or a dividend may be declared each year after paying running expenses, cost of repairs, etc.

Some cheese factories are able to haul the milk and manufacture the cheese of shareholders for less than one cent per pound. It is usual to charge non-shareholders an extra rate ef about one-quarter of a cent per pound. Unless there is a man in the neighborhood who is likely to succeed as a manager, and will undertake the work, it is better to start a factory on the private enterprise plan.

To form a joint stock company it will be best to proceed under the Ontario Act of 1888, which provides for the incorporation of cheese and butter manufacturing associations in a very simple manner.

AN ACT TO PROVIDE FOR THE INCORPORATION OF CHEESE AND BUTTER MANUFACTURING ASSOCIATIONS.

[*Assented to 23rd March, 1888.*]

HER MAJESTY, by and with the advice and consent of the Legislative Assembly of the Province of Ontario, enacts as follows:

1.—(1) At any time hereafter, any five or more persons who desire to associate themselves together for the purpose of manufacturing cheese or butter, may make, sign and acknowledge before a notary public, commissioner or justice of the peace, in duplicate, and file in the office of the registrar in the registry division in which the business is to be carried on, a certificate in writing, in the form mentioned in the schedule to this Act, or to the same effect, together with the rules and regulations, signed by such persons respectively.

(2) The signatures to the rules shall be verified by the affidavit of a subscribing witness thereto, made before a notary public, justice of the peace, or commissioner authorized to take affidavits, or before the registrar or deputy-registrar.

(3) Upon the filing of the certificate and the rules as aforesaid, the members of the association shall become a body corporate, by the name therein described, with the power to hold such lands as are required for the convenient management of their business.

(4) The registrar or deputy-registrar shall, if desired by the person filing the certificate, endorse on the other duplicate certificate and upon the duplicates of the rules, certificates of the other duplicates having been filed in his office, with the date of filing, and every such certificate shall be *prima facie* evidence of the facts stated therein and of the incorporation of the association.

(5) All rules made by the association may be repealed, altered or amended by other rules passed at a regular meeting called for that purpose, provided no such new rule shall have any force or effect until a copy, proved by the affidavit of the president or other head officer of the association to be a true copy of the rule or rules passed by the association at a meeting specially called for the purpose of considering the same, has been filed in the registry office in which the certificate of incorporation was filed.

(6) The association shall cause a book to be kept by the secretary, or by some other officer especially charged with that duty, wherein shall be kept,

- (*a*) A duplicate of the certificate and of the rules filed as aforesaid in the office of the registrar, so that persons becoming members of the association may sign the said certificate and rules.
- (*b*) Any member so desiring to become a member of, or a stockholder in the said association after incorporation as aforesaid, may sign the said certificate and rules in the said book and shall thereupon become such member, and he shall be entitled to the rights and privileges thereof, and shall become liable as such member as fully as though he had signed the certificate prior to the said incorporation of the association.

2. No association shall be registered under a name identical with that by which any other existing association has been registered, or so nearly resembling such name as to be likely to deceive the public.

3. Any certificate so to be filed may designate any one or more places where the business is to be carried on; but if in different registry divisions, a duplicate must be filed in the registry office of each division.

4. A member of an association incorporated under this Act may have shares therein to an amount mentioned in the by-laws of the association not to exceed $1,000.

5. Before an association commences operations under this Act they shall agree upon and frame a set of rules for the regulation, government and management of the association, which shall contain: (1) a mode of convening general and special meetings; (2) provisions for audit of accounts; (3) power and mode of withdrawal of members; (4) appointment of managers and other officers and their respective duties, and a provision for filling vacancies caused by death, resignation and other causes.

6. The rules of every association registered under this Act shall bind the association and members thereof to the same extent as if each member had subscribed his name and affixed his seal thereto; and all moneys payable by any member to the association, in pursuance of said rules, shall be deemed to be a debt due from such member of the association.

7. The capital of the association shall be in shares of such denomination as mentioned in the rules.

8. The shares of the association shall be transferable, subject to the consent and approval of the association.

9. All elections shall be by ballot, and each member shall have one vote for each share held by him, in respect of which he is not in default for any calls made thereon.

10. Every dispute between members or between members and the association established under this Act, or any person claiming through or under a member or under the rules of the association, and the directors, treasurer, or other officers thereof, shall be decided by arbitration in manner directed by the rules of the association, and the decision so made shall be binding and conclusive on all parties without appeal.

11. The liability of the shareholders shall be limited, that is to say, no shareholder in such association shall be in any manner liable for or charged with the payment of any debt or demand due by the association beyond the amount of his share or shares subscribed for, and any shareholder having fully paid up the amount of his said share or shares shall be absolved from all further liability.

12. The fees to be charged by the registrar for filing any certificate shall be fifty cents, and for any search relating thereto ten cents.

AMENDMENT, VICT. 58, CHAP. 41.

13. Every association incorporated under the Act passed in the 51st year of Her Majesty's reign, chapter 24, for the purpose of manufacturing cheese or butter, shall have power to raise money by mortgage upon the real and personal property of the association.

14. Every such mortgage shall be valid and binding upon the association to the extent of the interest conveyed thereby, and the covenants on the part of the said association therein contained, according to the true intent of the meaning thereof, when signed by the president and treasurer of the association, with the corporate seal of the association affixed thereto.

AMENDMENT, VICT. 60, CHAP. 39.

15. No such mortgage shall be given or shall be binding upon the association until the same has been authorized by a by-law passed by the vote given either personally or by proxy of a majority in value of the shareholders in the associaton at a special meeting of the association duly called for that purpose.

NORWICH JUNCTION CHEESE AND BUTTER MANUFACTURING CO.

The following is a copy of the certificate of the Norwich Junction Cheese and Butter Manufacturing Co. :

CERTIFICATE.

Province of Ontario, }
To Wit: }

We, Henry S. Moore, James Barr, Adam J. Stover, William Stover, Michael R. Stover, do hereby certify that we desire to form a company or association pursuant to the provisions of the "Act to provide for the incorporation of Cheese and Butter Manufacturing Associations."

The corporate name of the association is to be "The Norwich Junction Cheese and Butter Manufacturing Company," and the objects for which the association is to be formed are the purchase, manufacture and sale of cheese, butter and milk. The number of shares is to be unlimited, and the capital is to consist of shares of twenty-five dollars each, or of such other amount as shall from time to time be determined by the rules of the association. The number of the trustees who shall manage the affairs of the association shall be five, and the names of such trustees are Henry S. Moore, James Barr, Adam J. Stover, William Stover, and Michael R. Stover, and the names of the places where the operations of the said association are to be carried on are the township of North Norwich and the village of Norwich.

Dated Norwich, the 3rd day of September, 1892.

On the back of the certificate are two statements, as follows:

No. 1.—On the 3rd day of September, 1892, before me personally appeared Henry S. Moore, James Barr, Adam J. Stover, William Stover, and Michael R. Stover, to me known to be the individuals described in the written certificate, and they severally before me signed the said certificate, and acknowledged that they signed the same for the purposes therein mentioned.

T. BROWN,
A Commissioner for taking affidavits.

No. 2.—I hereby certify that a duplicate of the within instrument is filed in the Registry Office of the County of Oxford at 12 o'clock and 40 minutes p.m., the 5th day of September, A.D. 1892.

GEO. W. PATTULLO,
Registrar.

RULES AND REGULATIONS.

Following are the Rules and Regulations of a Cheese and Butter Company:

SHAREHOLDERS AND SHARES.

I. The company shall consist of shareholders holding one or more shares of $25 each, who have enrolled their names in a book kept by the Secretary of the company for the purpose.

II. The payment of shares shall be made in such manner and at such times as the directors of the company shall from time to time direct, but in each case the directors shall give at least thirty days' notice in writing to each holder of a share or shares in the company, of such a call upon the stock, and not more than twenty per cent. of the value of the subscribed stock shall be called in at any one time, and not more than thirty per cent. shall be called for within twelve months.

III. The directors shall call in at least ten per cent. of the subscribed capital stock of the company at or before the last distribution of the proceeds from the sale of products in each year until all indebtedness of the company which is not provided for by mortgage or otherwise is paid and satisfied.

IV. In default of payments of all or any such calls upon stock the directors shall proceed to enforce the payment of the same by an action of law, or they may in the exercise of their powers sell any such shares and apply the proceeds of the same toward the payment of any unpaid calls or call due in respect of such stock or shares, and the surplus, if any remains after the payment of such arrears and all expenses incurred by the directors of such actions, shall be deposited in some chartered bank to the credit of the defaulting shareholder, and all liability of the directors shall thereby cease.

V. No subscriber for stock shall be accepted as a shareholder or be entitled to hold stock in the company until the same has been duly allotted to him by the board of directors.

VI. Stockholders may sell or transfer their shares, but such sale or transfer must be made with the consent and approval of the directors of the company.

VII. The books of the Secretary for the transfer of stock shall be closed during fifteen days preceding each annual meeting of the shareholders. The Secretary shall register all transfers of stock in the books of the company, or where furnished with duly executed instruments of transfer signed by both transferor and transferee. A fee of twenty-five cents for each share transferred shall be paid into the general funds of the company. No transfer shall be considered valid until it has been made on the books of the company.

VIII. Each shareholder shall be entitled to one vote for every share which he or she may hold, and shareholders may vote by proxy duly appointed. No person shall be entitled to act as a proxy who is not himself or herself a shareholder of the company.

IX. No shareholder shall be entitled to vote upon any share or shares on which any regular instalment or call has become due and remains unpaid. No shareholder shall be entitled to vote on any stock unless the same has been registered in his or her name in the stock book of the company at least fifteen days prior to such general or annual meeting of the company.

X. No person shall be entitled to subscribe for or vote upon more than ten shares of the company, either in his or her own right or by proxy.

OFFICERS.

XI. The officers of the company shall consist of a President, Vice-President, Secretary and Treasurer and three Directors. The directors shall be elected at the annual general meeting of the company and shall hold office for one year and until their successors are elected. Shareholders only shall be eligible as directors in the company.

XII. The President, Vice-President and Directors shall constitute the board of directors. All the members shall retire every year, and an election shall take place at the annual general meeting for the appointment of their successors, and all the members of the retiring board of directors, if otherwise qualified, shall be eligible for re-election.

XIII. The President and Vice-President of the company shall be elected at the annual general meeting of the company, or shall be elected from the directors at the first meeting of the board of directors which is held after the annual general meeting of the shareholders.

POWERS OF DIRECTORS.

XIV. The presence of four directors shall constitute a quorum for the transaction of business at a meeting of the directors. The President, or, in his absence, any director who may be chosen by a majority of those present at such meeting, shall preside, a nd decide all questions of order subject to an appeal to the board.

XV. If the annual meeting of the shareholders and patrons has not appointed a salesman, then the board of directors shall appoint from their own number or from the shareholders or patrons of the factory a person who shall be salesman of the product of the factory.

XVI. The directors shall also appoint a Secretary and Treasurer, which two offices may be held by one person if the directors so decide, and the President, Vice-President or anyone may hold either office of Secretary or Treasurer or both.

XVII. The President shall have a vote as a director at all meetings, and in addition to that vote in the event of a tie shall have a casting vote as a chairman.

XVIII. The board of directors shall have full power to enter into agreements or contracts with any person or persons to carry on the business of the company, and such person or persons shall have their salaries and remunerations determined by the board of directors, to whom in all cases they shall be directly responsible.

XIX. The directors shall also have full power to determine all salaries and remunerations to officers of the company. But directors shall not be entitled to receive more than —— for each meeting which they attend, unless the same be authorized at the annual general meeting of the shareholders.

XX. The directors may borrow money for the purpose of the company in any manner which seems to them expedient, and their bond, promissory note or other obligation shall bind the company, and they are authorized to hypothecate, mortgage or pledge the real and personal property of the company in order to secure any sum or sums borrowed for the purpose of the company.

XXI. The corporate seal of the company and the signature of the President or other person designed for that purpose at a regular meeting of the board of directors, countersigned by the Secretary and Treasurer, shall be attached to all such instruments or documents pledging the credit of the company, except in the case of promissory notes, which shall be signed by the President and countersigned by the Secretary and Treasurer without attaching the corporate seal.

XXII. The board of directors may appoint from their own number an executive committee, to whom may be added the salesman and Secretary of the company, to whom they may designate executive powers to be exercised under the directions of the board, and they may also appoint standing committees.

XXIII. The directors shall also appoint one auditor to act in conjunction in the auditing of the accounts of the company with an auditor to be elected at the annual general meeting of the shareholders

XXIV. In case of any vacancy or vacancies occurring in the board of directors between the annual general meetings of the company they may be filled by qualified shareholders by the board of directors.

DUTIES OF SALESMAN.

XXVII.—(1) The salesman shall use his best endeavors to sell the products of the factory so as to further the interests of the patrons to the best of his judgment and ability.

(2) As soon as practicable after the completion of any sale he shall notify the President and Secretary of the quantities sold, the price agreed upon, particulars of sale, date of shipment, or any other condition or element in the transaction which affects the patrons or manufacturer.

ANNUAL MEETINGS.

XXVIII. The annual meeting of the shareholders shall be held at......................or at such other place in the vicinity as the directors may determine on the..... .... in each year.

XXIX. Notice of time and place of holding of such annual meeting shall be given at least ten days previously thereto in a newspaper circulating in the neighborhood, and also by postal notice to that effect mailed to each shareholder's address as last registered in the office of the company.

XXX. The rules of order for the annual general meeting shall be:

(1) The meeting called to order by the President or acting President.
(2) The reading and disposal of the minutes of the last meeting.
(3) The reading and disposal of communications.
(4) Reports of standing committee appointed by the general meeting of the shareholders.
(5) Reports of special committees appointed by the general meeting of the shareholders.
(6) Reports of officers, including the report of the salesman.
(7) Report of Auditors.
(8) Unfinished business.
(9) Nominations and election of officers for the ensuing year.
(10) Appointment of one Auditor.
(11) New business.

SPECIAL MEETINGS.

XXXI. Special meetings of the shareholders may be called by the President or any four of the directors or on the requisition in writing of ten shareholders of the company who may hold one-fourth of the stock (subscribed) of the company, and in every such call or requisition for a special meeting a statement shall be made of the definite purpose for which such special meeting is called, and no other business shall be transacted at such special meeting than shall be mentioned in the notice or notices which have been given calling the same.

XXXII. At least ten days' notice of every special meeting shall be given by advertising the same in a newspaper circulating in the neighborhood, and also by mailing a notice to the same effect to the address of each shareholder as last registered in the office of the company.

XXXIII. Any alteration in the by-laws of the company shall be made only by a two-third vote at the annual general meeting of the shareholders.

XXXIV. A copy of the by-laws shall be at all reasonable hours open for inspection by shareholders at the factory where the business of the company is carried on.

XXXV. If from any cause the annual general meeting shall not be held, or due and legal notice thereof shall not be given, then it shall be the duty of the directors to cause a special general meeting of the shareholders to be called as soon as may be, for the purpose of transacting the business of the annual general meeting, and all matters may be dealt with and acted upon as if such meeting were in effect the annual general meeting of the shareholders of the company.

Dated, , 189 .

DUTIES OF A SECRETARY OF A CHEESE OR BUTTER ASSOCIATION.

1. The Secretary shall keep an accurate record of the minutes of the annual meetings, special meetings of shareholders, and of meetings of the Board of Directors.
2. He shall keep an accurate account of all financial transactions of the company.
3. He shall keep a stock book for the proper recording of the ownership and transfers of shares in the company.
4. He shall render an accurate statement to each of the patrons of the company of his or her account therewith from time to time.
5. He shall prepare an annual statement of the business of the company, for the annual meeting and also for each patron. He shall also send an account of the affairs of the company to the Ontario Bureau of Industries at Toronto.

DUTIES OF TREASURER.

1. The Treasurer shall deposit all moneys received by him in some reliable bank, as treasurer of the company.
2. He shall pay the same always, and only, on the order of the President, duly countersigned by the Secretary.
3. He shall present vouchers for all expenditures to the Auditors and shall present a statement of receipts and expenditures of the company to the annual general meeting of the shareholders.

HINTS TO PATRONS.

1. Keep none but the best cows (pure-bred if possible), such cows as will give at least 6,000 pounds of milk in a year, or produce 225 pounds of butter-fat. To secure such, select the best grade cows in the herd and breed them to pure-bred males of a milking breed. Rear the heifer calves, giving them special feeding and training for the dairy. Breed these heifers to drop their first calf at about two-and-a-half years old. Manage the herd in such a way that at least half the cows drop their calves between October 1st and February 1st, for the winter dairy.

2. Provide a succession of green crops during the summer, partially or wholly to supplement pastures. Rye sown in the autumn makes an early green crop. The clovers follow, after which peas and oats or tares and oats, sown two or three times at intervals of ten days. Corn comes next, and is most valuable in the dairy for fall and winter feeding. This crop should never be sown thickly, but in rows or hills about three feet apart, that it may be thoroughly

cultivated. Such a system of feeding will prevent the cows drying up at a time when butter and cheese bring the highest price. A supply of pure water and access to salt at all times is necessary to obtain the best results.

3. Send to the factory nothing but clean, pure, wholesome milk, of good quality; and then demand pay according to its value, instead of in proportion to the poor milk, skim-milk or water furnished by other patrons.

4. Cleanliness in the pasture field and stable, in milking, and in the care of the milk is very important, and neglect to strain the milk through a good strainer should not be allowed. Milk for cheese factories and separator creameries should be aerated by pouring, dipping, or by the use of one of the many aerators in the market. The can of milk should be protected from rain and sun, and should not be exposed to bad odors of any kind.

5. It is better to have the whey fed at or near the factory. Where it is returned to the farm, see that the can is emptied and washed immediately on its return. Hogs should not be fed within 200 feet of the milk stand.

6. Where cream is supplied to a creamery, the milk should be set in deep cans in ice water, or in water that will cool the milk to 45 degrees in less than twelve hours. If ice is not used, the water surrounding the cans should be changed at least twice within two hours after setting. Aim to keep the cream sweet by keeping it in cold water until the driver calls for it. Where ten or more good cows are kept, it will pay to use a small cream separator, especially in winter.

MOTTOES.

For Milk and Cream Haulers :

Cleanliness, despatch, carefulness, honesty and punctuality.

For Cheese Factories and Creameries :

Cleanliness inside and outside, with goods of finest quality on the shelves or in the store room, and honest dealing with every patron. It will pay manufacturers to send a small pamphlet once a year to each patron, setting forth the proper methods of caring for milk or cream.

For all concerned ;

We are bound to produce the best goods made in any factory in the Province.

HINTS ON BUILDING CHEESE FACTORIES AND CREAMERIES.

In selecting a site, choose one that is central to the locality; one that may be easily drained, and has good roads leading to it; and one that is abundantly supplied with pure, cold water.

For details, see plans of creameries and cheese factories which are among the best now in use in the Province. It will pay to erect a good building and put in first-class machinery. In any case, secure a building suitable for the purposes intended, and one that will be convenient, cool in summer, and warm in winter.

The walls of the buildings may be built of brick, stone or wood. If wood is used, nail rough lumber horizontally on the studding, then put on building paper, and either matched or dressed lumber and battens for the outside. The whole should be neatly painted some light color, with a darker color around windows, doors and cornice.

The floors of the make-rooms should slope to gutters for convenience in cleaning. The floor of the curing-room in cheese factories should be double, having building paper between the rough lumber laid on the joists and matched lumber for the floor proper. The store-room floor of creameries may be an ordinary floor, hard earth, or domestic cement.

Common Faults in Creameries and Cheese Factories.

1. *Bad foundations,* which do not properly support the buildings, especially in the centre. Stone or concrete foundations are the best. There should be a centre cross-wall to prevent sagging.

2. *Insufficient control of temperature.* The use of building paper and "dead air" spaces in the walls assists very much in gaining control of heat and cold. Steam heat, a furnace or a good stove (coal preferred) should be a part of the equipment in every factory. In the cheese curing-room especially, a proper temperature is needed.

3. *Imperfect ventilation.* In addition to plenty of windows, which should be opened at night and closed in day time during hot weather, there is need of proper ventilators from both the top and bottom of the room.

4. *Bad floors.* Norway pine lumber is the best kind of wood for floors. The joints should be put together with white lead and the floor coated twice with hot linseed oil before it is used.

5. *Defective drainage.* This causes offensive smells in and around the factory. The system adopted at the Black Creek factory appears to be a good one. (See description of this factory.)

6. *The lack of tidiness, neatness and order* apparent in and about most of our creameries and cheese factories.

Changing Cheese Factories into Winter Creameries.

Instead of closing the cheese factory as soon as cold weather commences, butter-making apparatus should be placed in the factory wherever possible and the winter milk made into creamery butter. In localities where there are a number of small factories, separators only may be placed in several, and the cream be sent to a central point for churning. This plan saves expense in hauling the milk long distances. The cost of utensils required for changing a cheese factory into a winter creamery is from $600 to $1,000. One separator will handle from 5,000 to 8,000 pounds of milk every other day. If over 8,000 pounds of milk are received daily, or every other day, two separators will be required, so that patrons may not have to wait too long for their skim-milk.

In case the boiler and engine of the factory are not large enough and the building is not warm enough, additional outlay is necessary before a change can be made. Where the business will warrant it, a separate butter-making building will give best satisfaction.

The following statements give the approximate cost of equipment. From $50 to $75 more may be allowed for extras.

Cheese Factory Outfit for 500 Cows, Exclusive of Buildings.

Boiler, 10 to 12 h.p.	$150 00
Two 600-gallon vats	110 00
One 12-hoop Fraser gang press	75 00
One 6-gang upright press	50 00
One 14-foot curd sink	20 00
One 800-lb. scale, double beam	20 00
One 50-gallon weigh can	8 00
Milk conductor, head and pipe	3 50
Two curd knives	9 00
Curd scoop, dipper, pails and thermometer	4 00
One 24-bottle Babcock tester	18 00
One curd mill	15 00
Steam pipe, shafting, pulleys, hangers, etc., about	50 00
	$532 50

Outfit for a Creamery on the Separator Plan for 500 Cows, Exclusive of Buildings.

Boiler and engine	$275 00
One separator	350 00
Two 300-gallon cream vats	80 00
One 400-gallon receiving vat	50 00
One 400-gallon churn and butter worker	100 00
One 800-lb. scale, double beam	20 00
One 50-gallon weigh can	8 00
One conductor, head and pipe	3 50
One 24-bottle Babcock tester	18 00
Dippers, pails and thermometers, say	5 00
Butter ladles and packer	2 00
One tempering vat or heater	15 00
Shafting, belts and pulley, say	75 00
One 240-lb. scale	8 00
	$1,009 50

Cream Gathering Outfit for a Creamery of 500 Cows, Exclusive of Buildings.

One boiler and engine	$275 00
Two 300-gallon cream vats	100 00
One 400-gallon churn and butter worker	100 00
One 800-lb. scale, double beam	20 00
One 240-scale—butter	8 00
Ten Curtis refrigerator carrying cans	100 00
One No. 2 oil test churn, Curtis	60 00
Five driver's cases	12 00
Pails, ladles, packers, etc., say	5 00
Shafting, pulley, belts, etc	50 00
Sundries	10 00
One 50-gallon weigh can	8 00
	$748 00

Outfit of Combined Cheese and Butter Factory on Cream Gathering Plan for 500 Cows Exclusive of Buildings.

Boiler and engine	$300 00
Two 300-gallon cream vats	80 00
One 400-gallon churn and butter worker	100 00
One 800-lb. scale, double beam	20 00
One 240-lb. scale, butter	8 00
Ten Curtis refrigerator carrying cans	100 00
One No. 2 Curtis oil test churn	60 00
Five driver's cases	12 00
Pails, ladles, packers, etc., say	5 00
Shafting, pulleys, belts, etc., say	50 00
One 50-gallon weigh can	8 00
One conductor, head and pipe	3 50
One 24-bottle Babcock tester	18 00
Two 600-gallon cheese vats	110 00
One Fraser gang press	75 00
One 6-gang upright press	50 00
One 14-foot curd sink	20 00
Two curd knives, perpendicular and horizontal	9 00
One curd mill	15 00
Curd scoops, pails, etc	5 00
	$1,048 50

Outfit for Cheese Factory and Creamery Combined, with Separator, for 500 Cows, Exclusive of Buildings.

Boiler and engine	$300 00
One separator	400 00
One 400-gallon receiving vat	50 00
Two 300-gallon cream vats	100 00
One 400-gallon churn and worker	100 00
One 800-lb. scale	20 00
One 50-gallon weigh can	8 00
One conductor, head and pipe	3 50
One 24-bottle Babcock tester	18 00
Dippers, mops, thermometers, etc., say	5 00
Butter ladles, pails and packers	5 00
One tempering vat or heater	15 00
Two 600-gallon cheese vats	110 00
One Fraser gang press	75 00
Six upright gang presses	50 00
One 14-foot curd sink	20 00
Two curd knives	9 00
Curd scoop, pails, etc., say	5 00
Curd mill	15 00
Shafting and pulleys, say	75 00
One 240-lb. butter scale	8 00
	$1,391 50

PLANS OF CHEESE FACTORIES AND CREAMERIES.

Through the kindness of the owners we are enabled to present in the following pages the plans of several prominent cheese factories and creameries.

Cost of Constructing Buildings.

The contract price for building the Norwich Junction cheese and butter factory was $4,095. A factory similar to the Strathallan cheese factory can be erected for from $3,000 to $3,700, according to material used. Buildings for a creamery on the Ayton plan would cost about $1,600.

Ayton Creamery, Owned by Mr A. Wenger, of Ayton.

The front or north side is on level with ground. The south end is possibly six feet under ground, which gradually slopes to the front. Cream vats are raised on trestle-work, about four feet from the floor, so that the cream flows into the churns. The store-rooms are cooled with cold water. There is a large pan made of galvanized iron which should cover the whole size of the storage-room. This pan is twelve inches deep and the bottom bends down between the joists. Under the apexes of the pan are small wooden troughs which carry away the drip into a trough leading into the gutter. Three pipes (half-inch) run from the main pipe and empty into the pan. When the pan becomes full the water passes out in an overflow pipe into the gutter. This keeps the storage room at about 55° to 56° during summer. Occasionally it may rise to 58°.

Walls are of stone two feet thick. Ceilings plastered, except where cold water pan is. Floor in cream-room and work-room is maple, well oiled. Storage-rooms, cement floors.

Back of creamery there is a hill of considerable size. A spring rises out of this hill, which supplies water to all points where it is wanted.

BLACK CREEK COMBINED CHEESE FACTORY AND CREAMERY.

OWNED BY THOS. BALLANTYNE & SONS, STRATFORD.

These buildings cost $7,700. The cheese-making machinery, including boiler and engine, cost $1,500; the butter-making machinery, without boiler and engine, cost $1,200—total cost of building and machinery, $10,400. In addition there are three hog pens, capable of holding 500 hogs; a granary; wind-mill for pumping manure; a barn; a house for the cheese and butter-maker—value of these $4,000. The total value of the property is over $14,000.

The following is a description of the factory as given by Mr. Geo H. Barr, the maker, at the annual convention of the Western Dairymen's Association held in Brantford, January, 1897:

At the Black Creek factory, where I am at present, and where I have been for several years past, the maker does not suffer from lack of proper buildings, or from lack of proper equipment, for I believe this factory is the finest in Canada, and I have included in my paper a description of some of the special features connected with it. It is built and equipped for both butter and cheese-making. The creamery is a room 35 x 40 at the south end of the building, and immediately adjoining the creamery on the north comes the vat room, which is 35 x 52; then comes the press room to the north of the vat room, this room being 35 x 30. The milk is taken in at the two windows on the west side of the building and opposite the vat room, of course. The boiler room is on the east side of the building, and so situated that one door opens out of the vat room and another out of the creamery into it; and adjoining the boiler room on the south with a door leading out of the creamery there is a very comfortable office, properly furnished, where the maker may do the necessary work on the factory books in comfort and free from disturbing surroundings.

The ceilings are twelve feet high and are finished in black ash oiled, the walls are hollow brick walls built of red brick and finished outside with red mortar; on the inside there is a wainscotting of cement four feet high, and above the cement white plaster, both the cement and plaster being put directly on to the bricks. The high ceilings, large windows and white walls make an airy and well-lighted building.

The boiler room has a brick smokestack forty feet high, which is an ornament to the building, besides being a good investment; it will last so much longer than an iron smokestack, and the insurance is thereby reduced twenty-five cents per $100 per annum. Both the cold and hot water tanks are elevated above the ceiling of the boiler room, the cold water tank being high enough to empty into the hot water tank, and pipes connect with both of them to convey hot or cold water to the parts of the building where wanted. A pipe also leads from the cold water tank to the south end of the creamery, and a piece of hose is attached to it there for the purpose of putting cold water into the cans before the milk-hauler leaves the factory; and nothing is more appreciated by the patrons. The water keeps the milk from sticking to the cans and makes them easy to wash.

The whey runs from the vats to a large tank in the ground, from which it is forced 100 yards through pump logs to the hog pens by an ejector. Besides this large whey tank there is a smaller tank, into which all the washings and waste water of the factory run, and the same ejector forces it through the same pump logs past the hog pens to a large open trench with gravel bottom, through which it filters to a neighboring stream. By this means of disposing of the washings and waste water, the factory and surroundings are free from the usual smell so terribly offensive that is usually looked upon as a necessary accompaniment to every cheese factory.

The curing room is sixty feet north of the making room, and is placed that distance away for the purpose of reducing the insurance on this building and upon the cheese in it, the rate charged upon the curing room and upon the cheese in it, being seventy cents per $100 per annum, which is the ordinary storehouse rate, and, as you will readily see, is a great saving from the rate usually charged upon cheese factories.

The walls of the curing room are built of brick, same as the making room; and the building is divided into two rooms. In each room there are two ice racks suspended about four feet from the ceiling into which we can put ice during the hot spell, and thereby prevent the temperature getting so high as to do any damage to the cheese. These racks are supported on cross pieces fastened to the upright posts, to which shelving is attached, and galvanized iron underneath the racks conveys the drip from the melting ice to a gutter, which leads to a small conductor pipe that conveys the water out of the room.

In cold weather heat is supplied from a hot-air furnace, which is much better than an ordinary coal stove or wood stove; it is much easier regulated, is more economical of fuel, and the circulation of air in the room is more perfect. You will see that there are several new and special features about this factory that all go towards improvement and might be copied by others with benefit to themselves.

COMBINED CHEESE FACTORIES AND CREAMERIES.

OWNED BY D. M. MACPHERSON, M P.P., LANCASTER.

In addition to the plans and descriptions furnished by Mr. Macpherson, the well known dairyman from Eastern Ontario, he offers the following advice in building and operating:

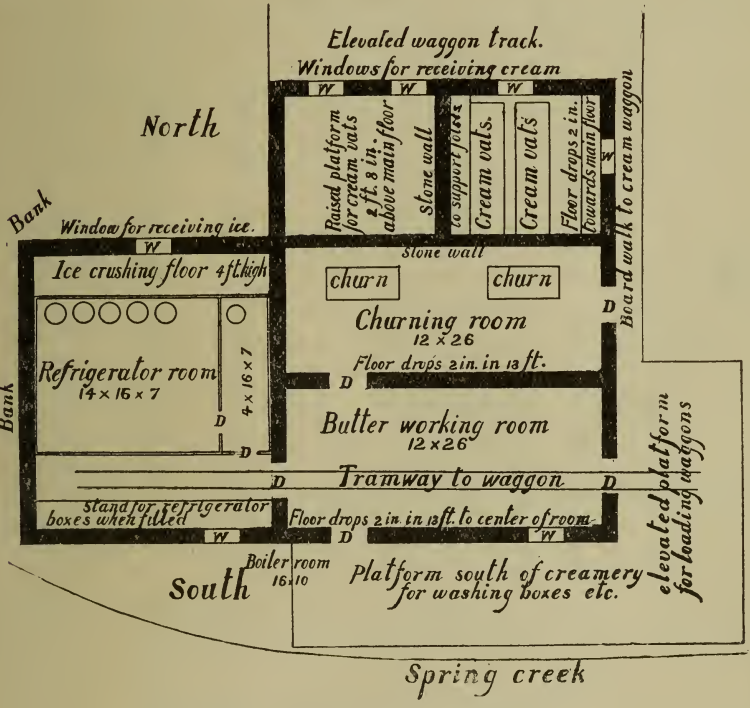
"I consider it very important that butter and cheese factories be so arranged that each department may be carried on as desired—one day butter and the next day cheese—without disturbing the work of one or the other. I consider the combined factory is the ideal factory to have in all large sections or centres, so that they may be run the year round—winter and summer. I have now fifteen of these factories in operation, and from three years' experience of them I believe they are the best kind of factories to encourage in Canada. With these, the dairymen will have a more uniform price for their milk, and thus prevent over-production of butter or cheese They will tend to steady the market and make a steadier support to all such well conducted faotories."

PLEASANT VIEW CREAMERY, OWNED BY MR. JAMES STRUTHERS, OWEN SOUND.

The creamery is built of stone, with 18 inch walls. The front part is 26 x 36, and 14 foot ceiling, and is divided as follows: Butter working room 12 x 26, partitioned off by a wall lathed and plastered on both sides. A space 12 x 26 is used for the churning room. The water wheel used for power occupies a place in the centre of this part. A platform 12 x 26 feet and elevated 2 feet 8 inches above the main floor, is occupied by the cream vats. The extension to the rear of main building, 20 x 24 x 14, is partially under ground and is used for store rooms. We are building in this room an improved cold storage, 16 x 14 x 7 foot ceiling. The stone walls throughout the interior of the creamery are flushed with mortar, leaving a fairly smooth surface. The ceilings are ceiled with V joint basswood, and when thoroughly and carefully whitewashed, present a bright appearance.

I would say to anyone intending to build a creamery—let your ceilings be a good height, not less than 14 feet. I have had a trial of low ceiling and found it very difficult to keep the temperature of the room down, especially when using warm and scalding water for cleaning vats, etc.

We have no trouble with high temperature in Pleasant View Creamery, and only very few flies are brave enough to stand the low temperature and stay with us.


Elevated waggon track.
Windows for receiving cream
W
W
W
North
Raised platform for cream vats 2 ft. 8 in. above main floor
Stone wall
to support joists
Cream vats.
Cream vats
Floor drops 2 in. towards main floor
W
Board walk to cream waggon
Bank
Window for receiving ice.
W
Stone wall
Ice crushing floor 4 ft. high
churn
churn
Churning room
12 x 26
D
Refrigerator room
14 x 16 x 7
4 x 16 x 7
Floor drops 2 in. in 13 ft.
D
Bank
D
Butter working room
12 x 26
D
D
Tramway to waggon
D
Stand for refrigerator boxes when filled
Floor drops 2 in. in 13 ft. to center of room
D
W
W
elevated platform for loading waggons
Boiler room
16 x 10
South
Platform south of creamery for washing boxes etc.
Spring creek

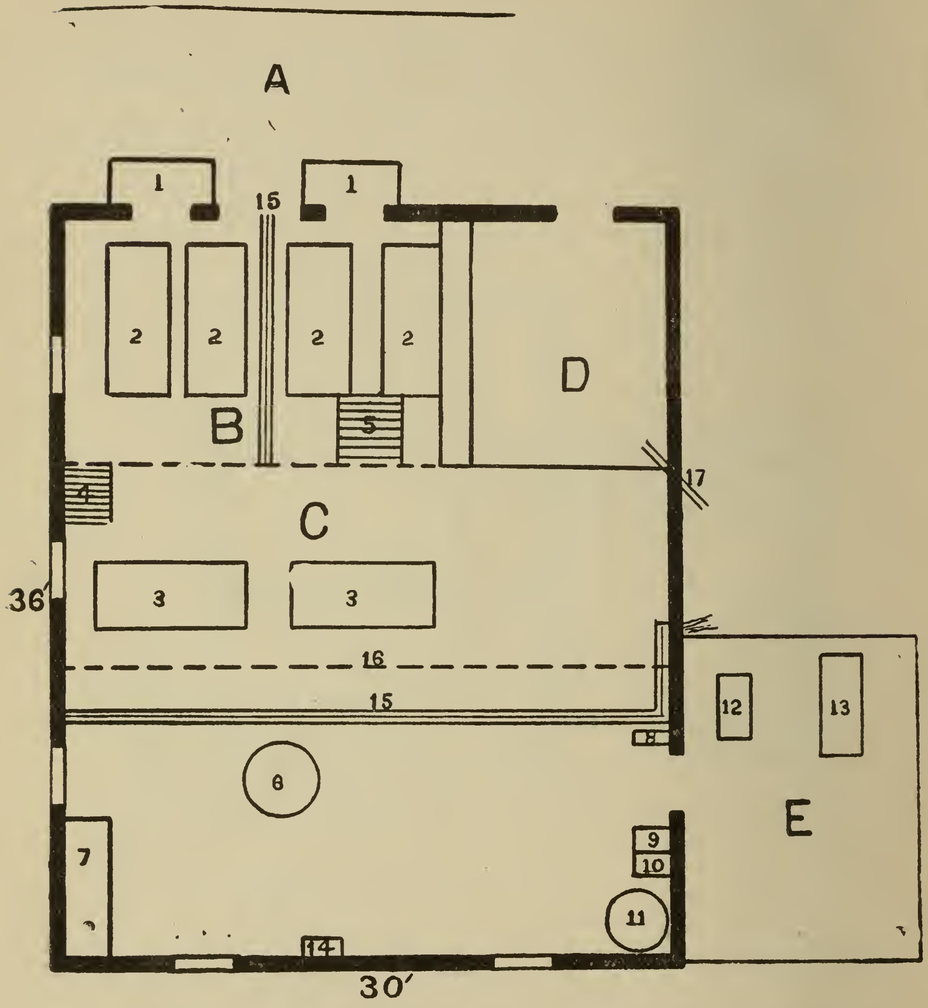
Pleasant View Creamery—Grey Co.

The floors throughout are laid with Norway pine, and have a fall of 2 inches in 12 feet to the centre of the building, where openings are made in the floor directly above the waste water race. Here the scrubbing water, etc., escapes, and is carried away with the waste water from the wheel. An upright steel boiler of eight horse power is placed outside the main building in a convenient position, where a barrel of water is continually boiling by means of a jet of steam from the boiler, which furnishes plenty of washing and scalding water. This boiler furnishes steam for warming cream and heating building when required. The pipes used to conduct steam to the vats are arranged so as to conduct spring water instead, if needed.

The capacity of Pleasant View Creamery is 2,000 pounds of butter per day. The cost of the building was $1,250 to $1,300, without any plant.

PLAN OF CREAMERY ON CREAM GATHERING PRINCIPLE.

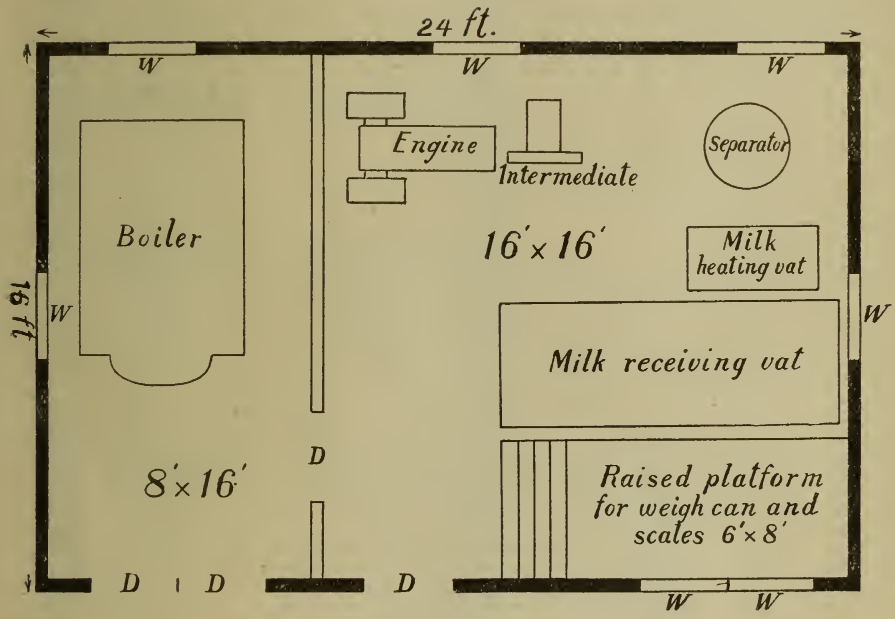
CAPACITY, 500 TO 700 COWS.



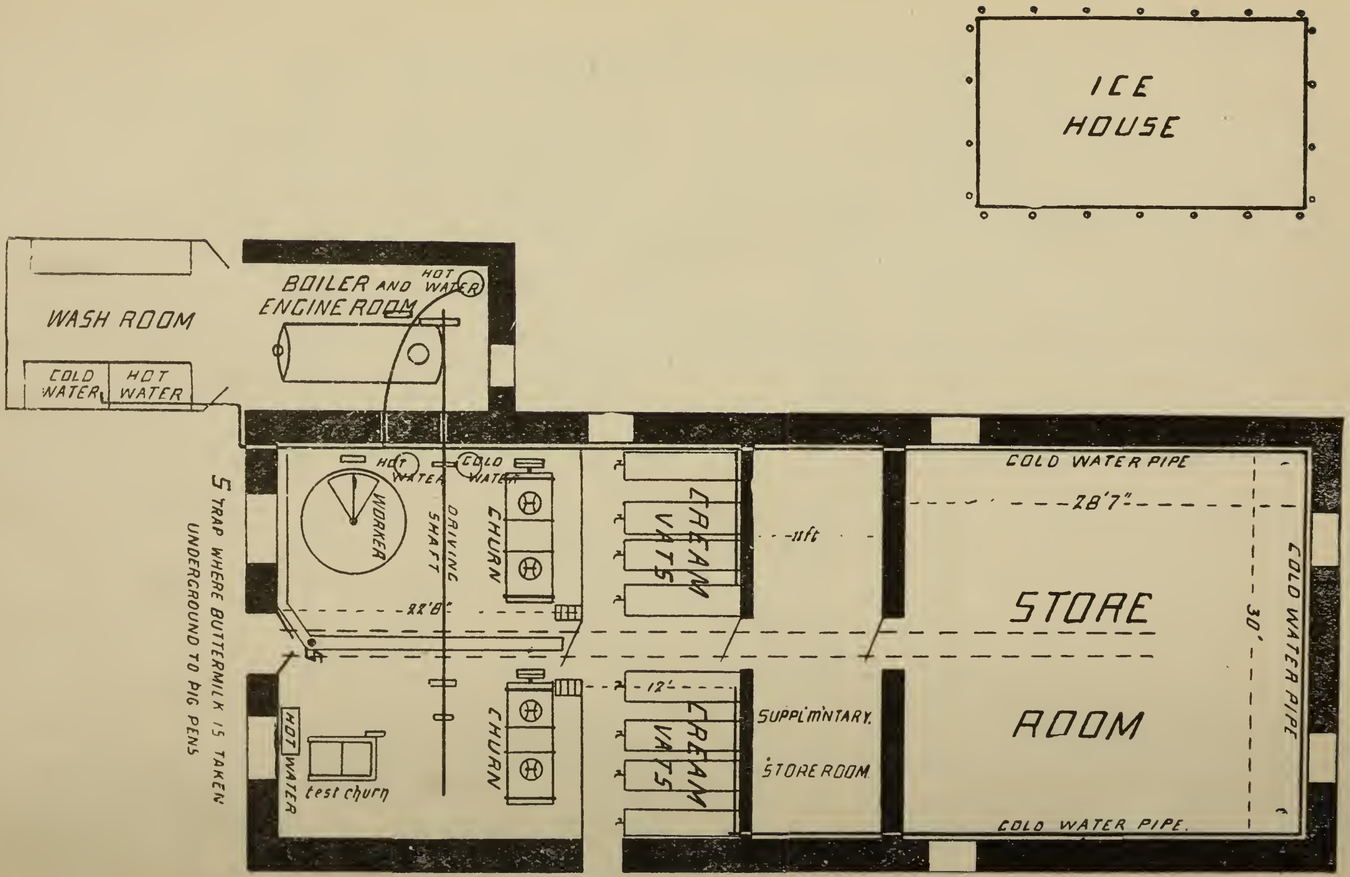
A. Covered driveway.
B. Cream platform raised 3 feet.
C. Churning floor.
D. Ice house.
E. Engine and boiler room.

1. Platform for delivery can.
2. Cream vats.
3. Churn.
4. Steps to platform.
5. Steps to storeroom underneath.
6. Worker.
7 Salt table.
8. Oil test churn.
9. Hot water.
10. Cold water.
11. Cold water tank elevated.
12. Engine.
13. Boiler.
14. Desk.
15. Gutter.
16. Line of shafting.
17. Drain from ice house.

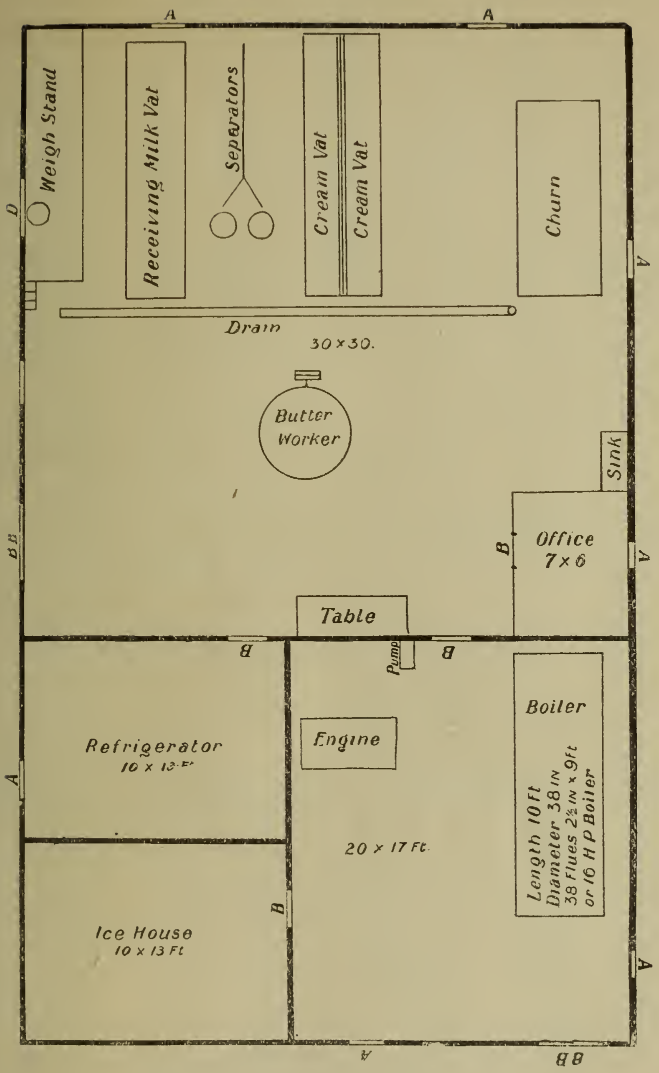
Floors in B to slant one inch to gutter, in C to slant two inches to gutter.



GROUND PLAN OF A SKIMMING STATION.



Ayton Creamery—Grey Co.



Lansdowne Creamery—Leeds Co.

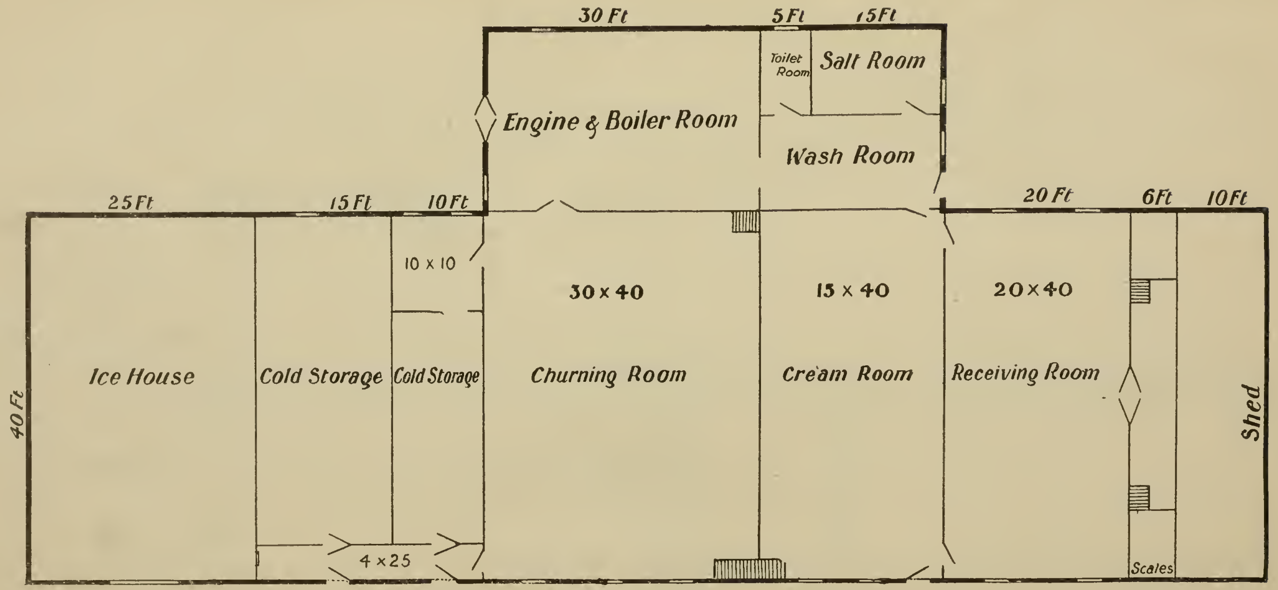
Cost of building, $1,400 ; cost of machinery, $1,800.

Capacity of creamery from 1,200 to 1,500 lbs. butter per day.

The walls of the building are built of brick, with air space between. The roof is metal, thus reducing risk from fire.

A—windows. B—doors. BB—double doors. D—slide door.

The building is 50 x 30 feet and one story high.

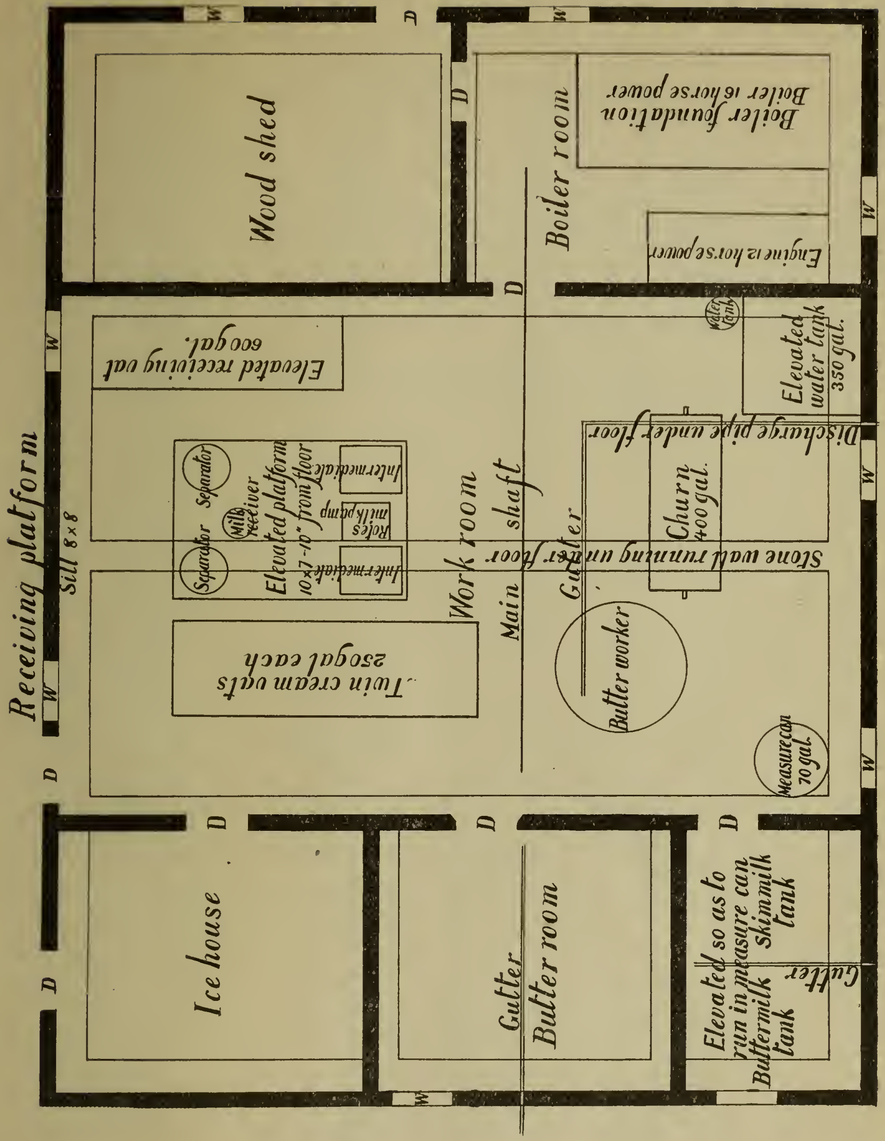


THE RENFREW CREAMERY—RENFREW CO.

The ground floor contains separator, cream, churning and butter working rooms, cold storage, etc. The second floor is devoted to the office, testing room and store room. The garret contains the steam fittings and tools, as well as being a workshop.

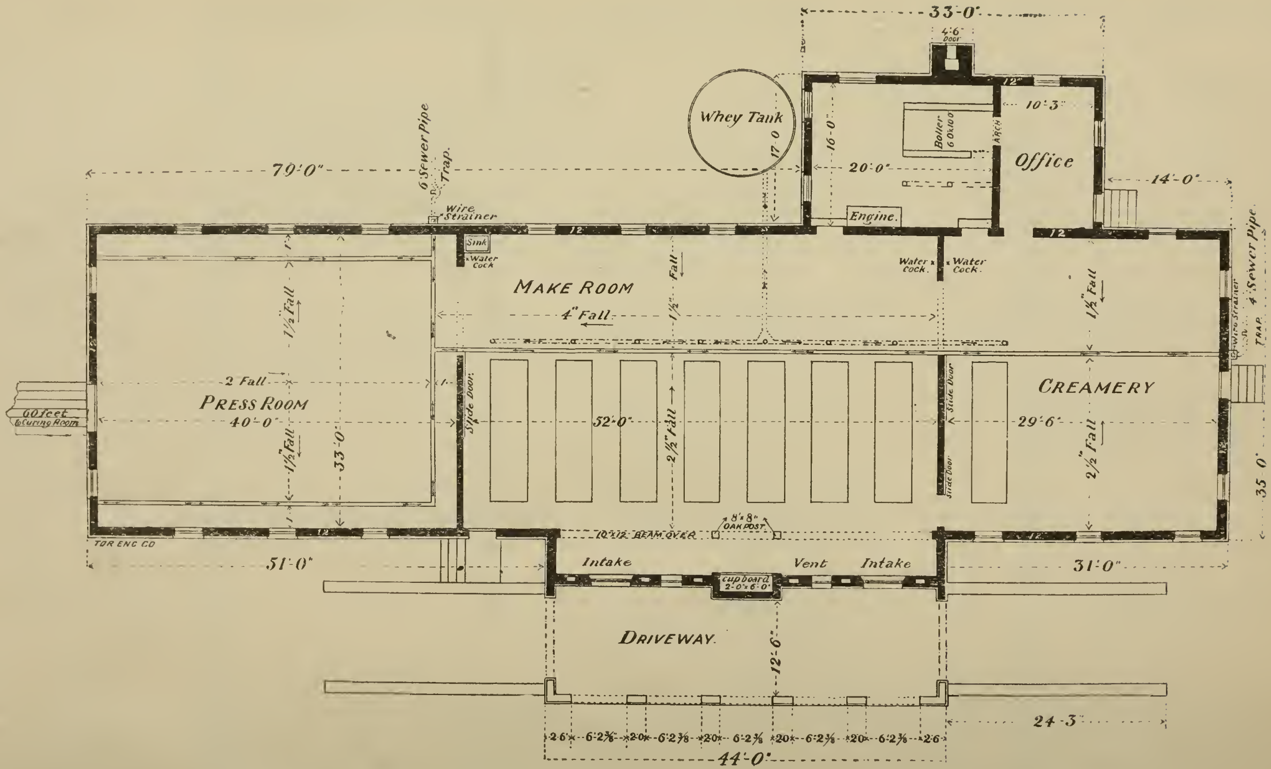
The main cream building cost about $6,000 and the machinery in the main building cost about $3,000.

The skimming stations (of which there are nine) cost about $550 each, and the machinery in each, including one separator, $1,000.



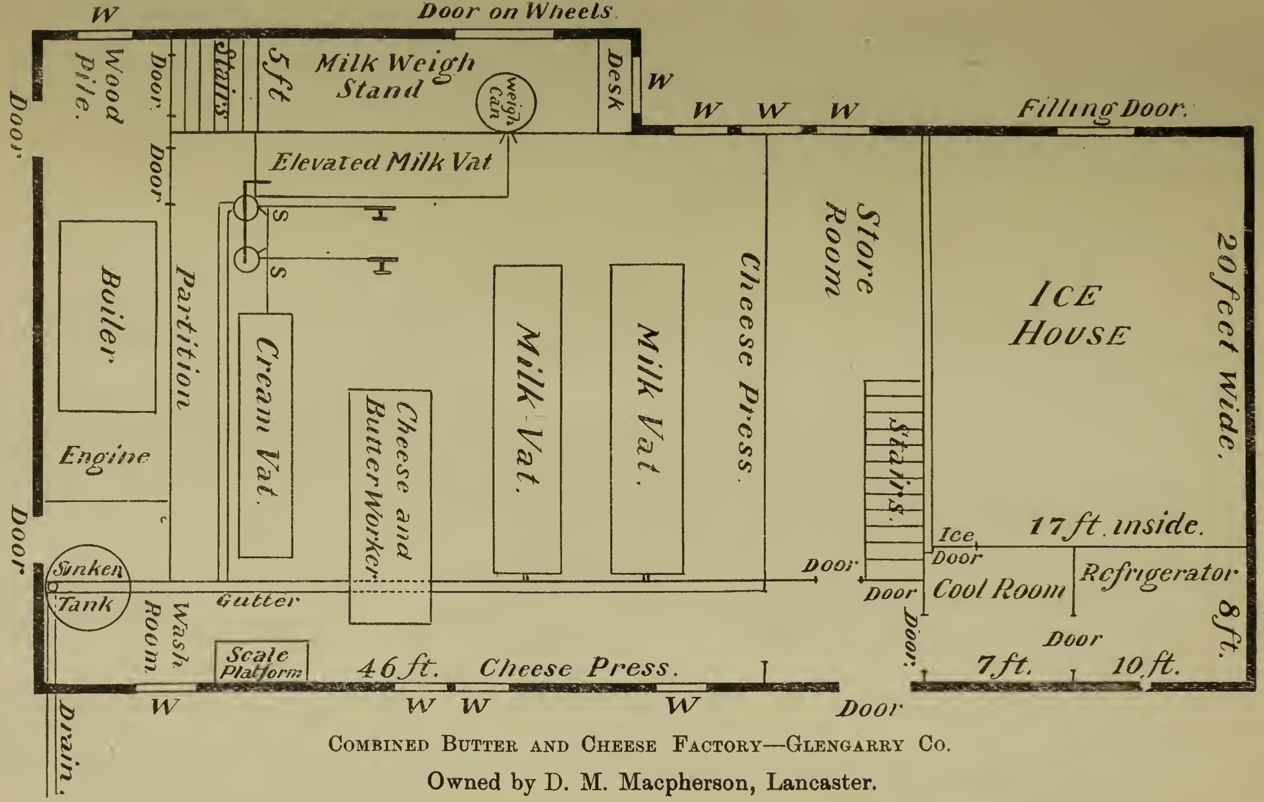
THE TILLEY CREAMERY—LEEDS CO.

Built in 1896, about three miles from Lansdowne. The building is of wood and cost complete $1,040. The cost of the machinery, including boiler and engine, two separators, receiving vat, cream vats, churn, worker, pumps shafting, pulleys, etc., was $1,255. The piping, belting, water tanks, milk tanks, placing of machinery and heating apparatus, cost $505—or a total cost of $2,800. Capacity 25,000 to 30,000 lbs. milk per day.



Black Creek, Combined Cheese Factory and Creamery—Perth Co.

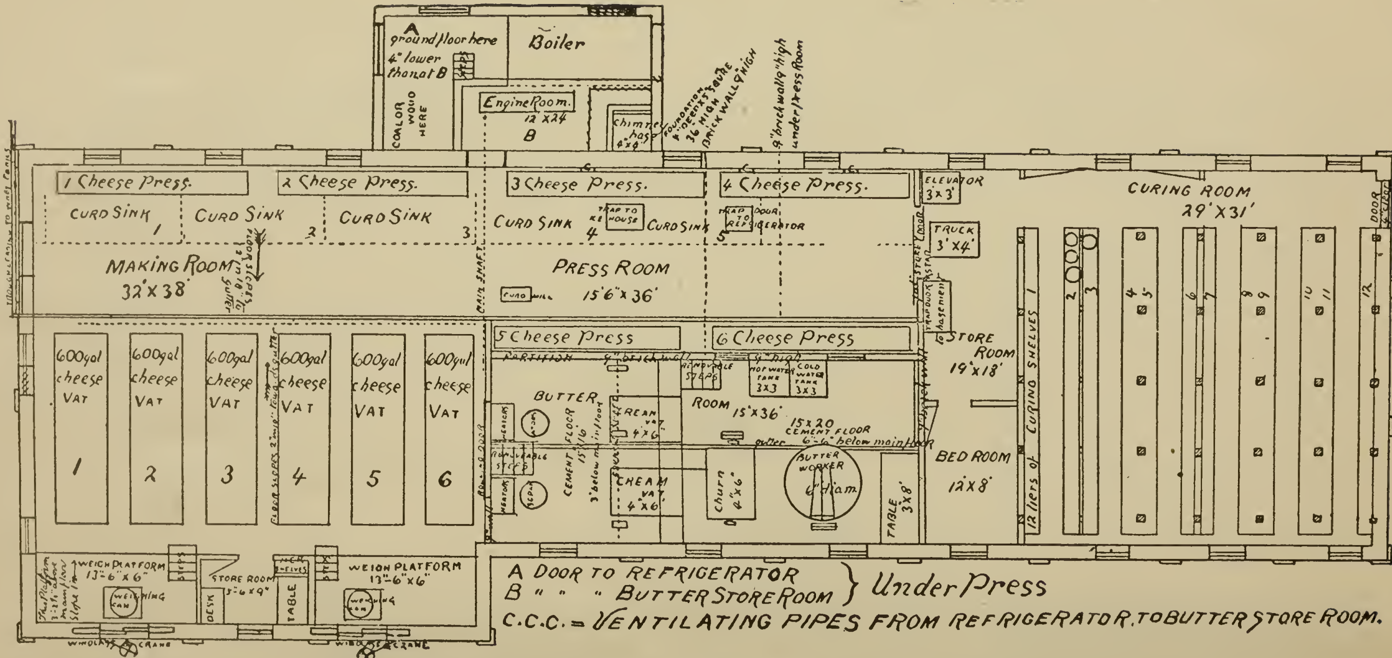
Owned by Messrs Thos. Ballantyne & Sons, Stratford.



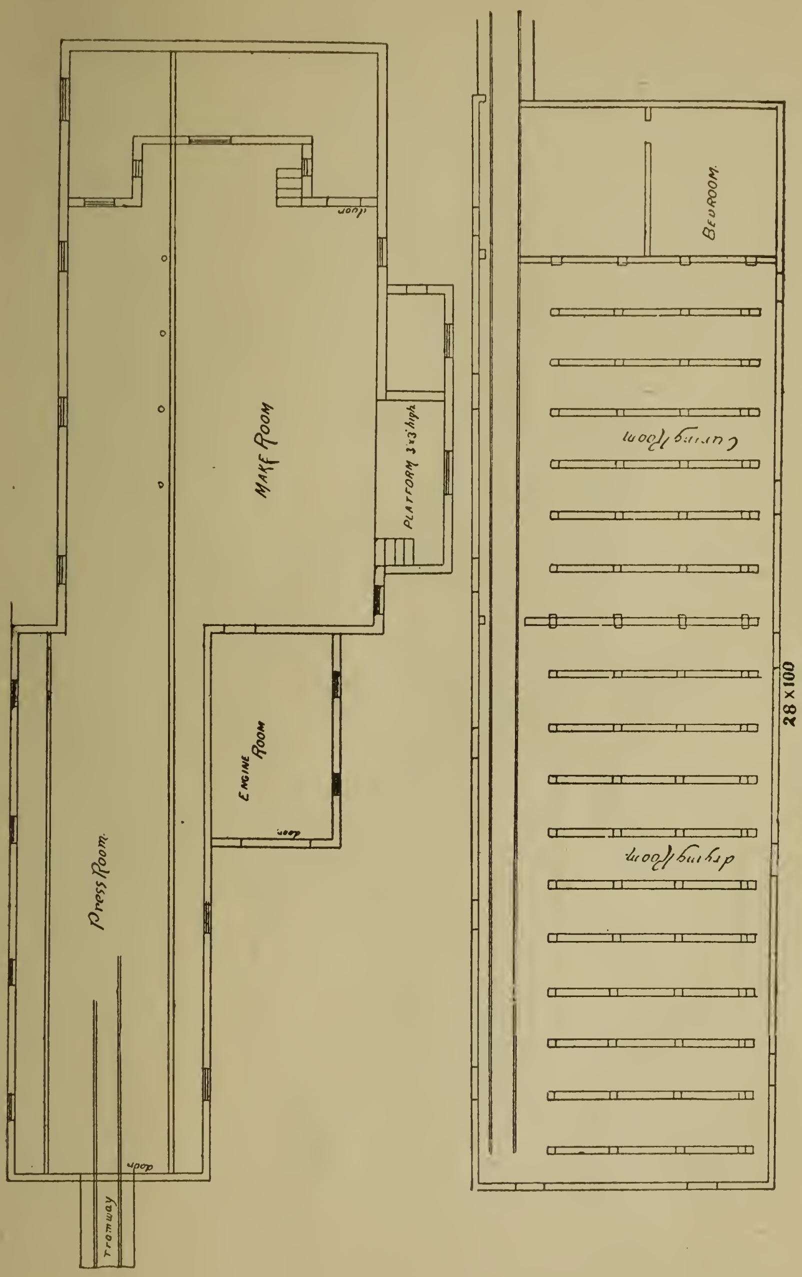
Combined Butter and Cheese Factory—Glengarry Co.

Owned by D. M. Macpherson, Lancaster.

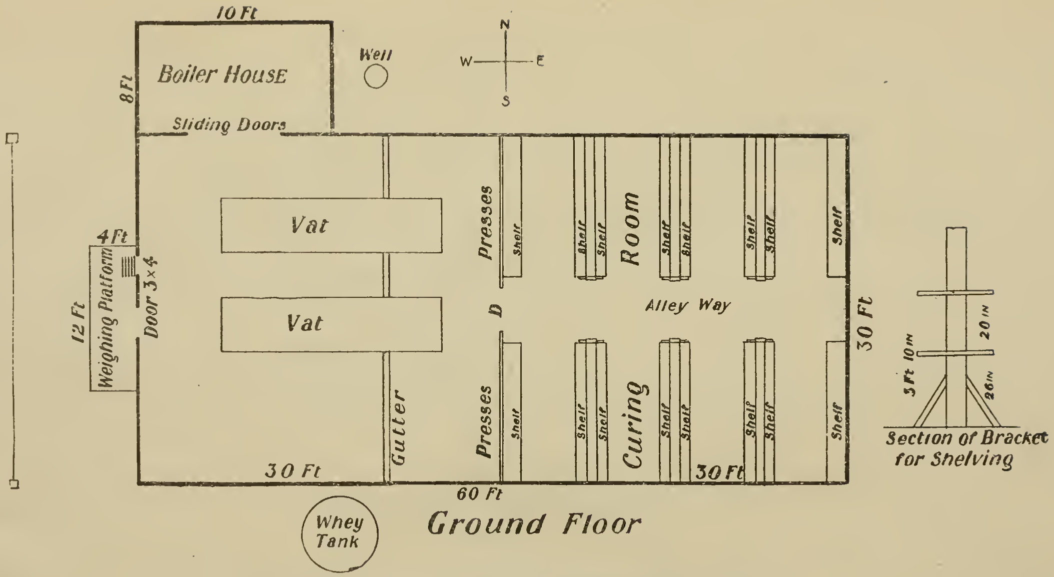
The cheese-curing room is above the making-room. A partition is put across 12 ft. from the end over the boiler for water and skim-milk tanks.



NORWICH JUNCTION CHEESE AND BUTTER FACTORY—OXFORD CO.



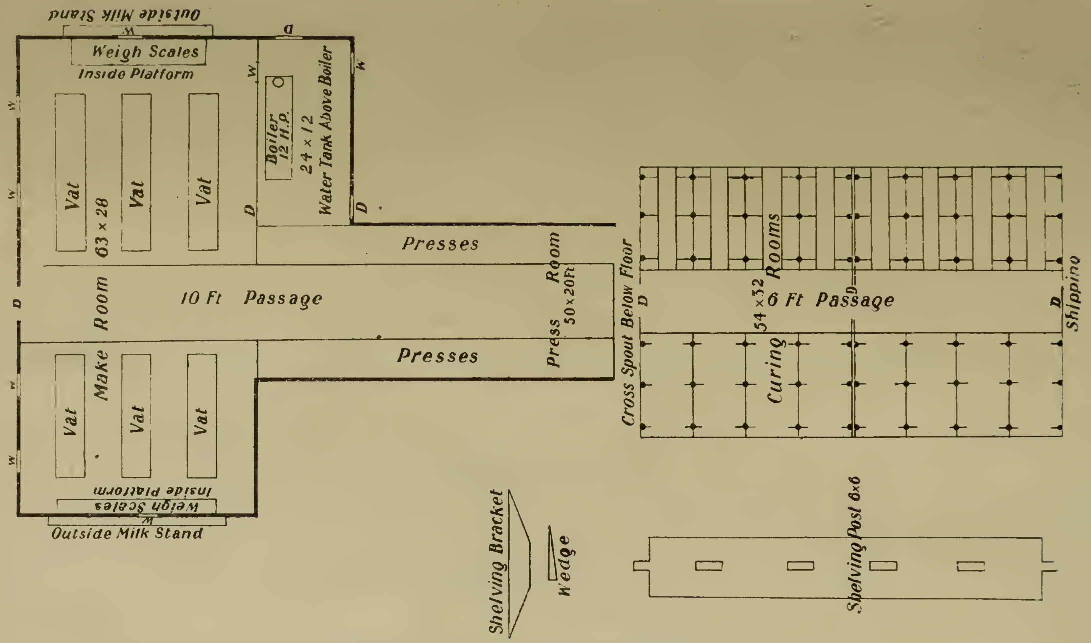
Strathallen Cheese Factory—Oxford Co.



South Mountain Cheese Factory—Dundas Co.

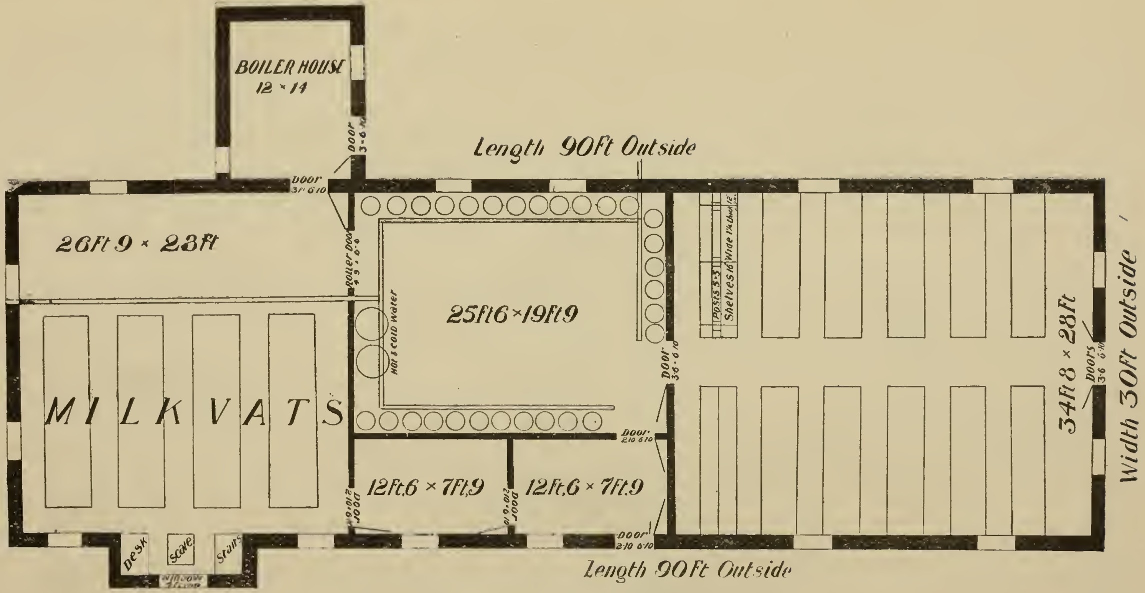
Owned by Wm. Eager, Morrisburg.

Factory built on cedar posts sunk four feet into ground, one foot above surface; 8 inch sills on top of posts; 8 inch joists on top of sills; 1½ inch flooring, tongued and grooved. Making-room floor incline to gutter 21 feet from the west end. The other portion of the floor inclines from the partition (8 ft.) to the gutter. The floor of curing-room is level. Walls 2 x 4 inch on top of sills, sheeted inside and outside with rough lumber, 4 inch air space; felted inside and out; clap-boarded on outside, inside tongued and grooved matched boarding. Height 12 ft. from the bottom of sill to top of plate. Upper floor laid on 6 inch joist; beam running through centre of building supported by two pairs of principal rafters with bolts running through rafters and beams. Upper floor double with felt paper between. Ceiling of upper floor sheeted with tongued and grooved boards. Shingled roof. Cost of building, $900. Cost of machinery, $700.



BLUEVALE CHEESE FACTORY—HURON CO.

Making-room, 63 x 28 ft.
Press-room, 50 x 20 ft.
Curing-room, 54 x 32 ft , divided into two equal portions.
Boiler-room, brick floor, 24 x 12.
Cost of buildings, $2,400.
Cost of plant, $1,500.
Cost of whey vats and pig pens, $500.
Cost of butter plant now being put in $1,300.

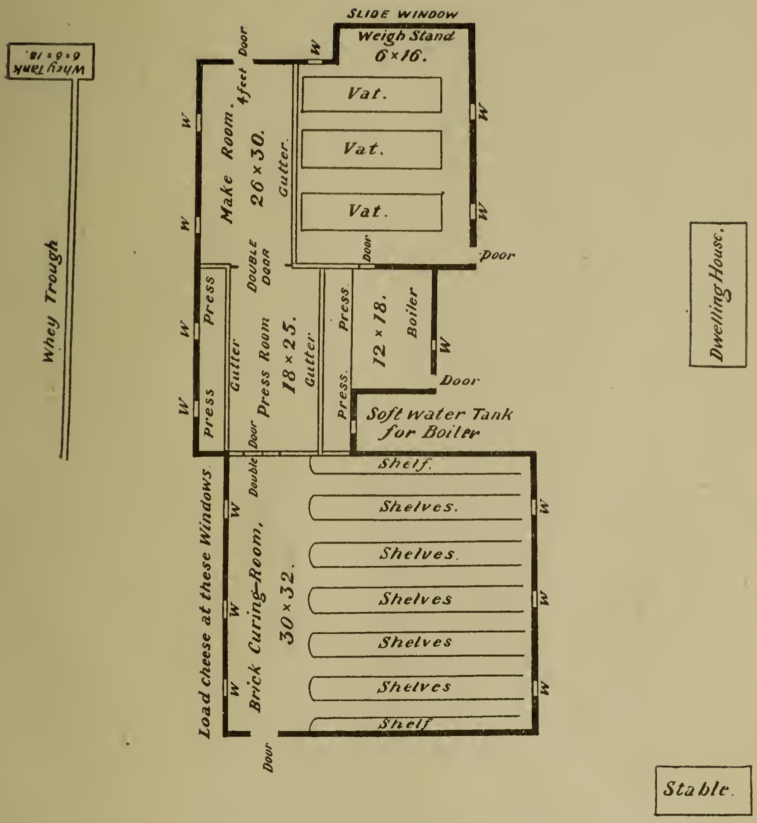


Carthage Cheese Factory—Perth Co.

Owned by Mr. Hugh Jack, Newton.

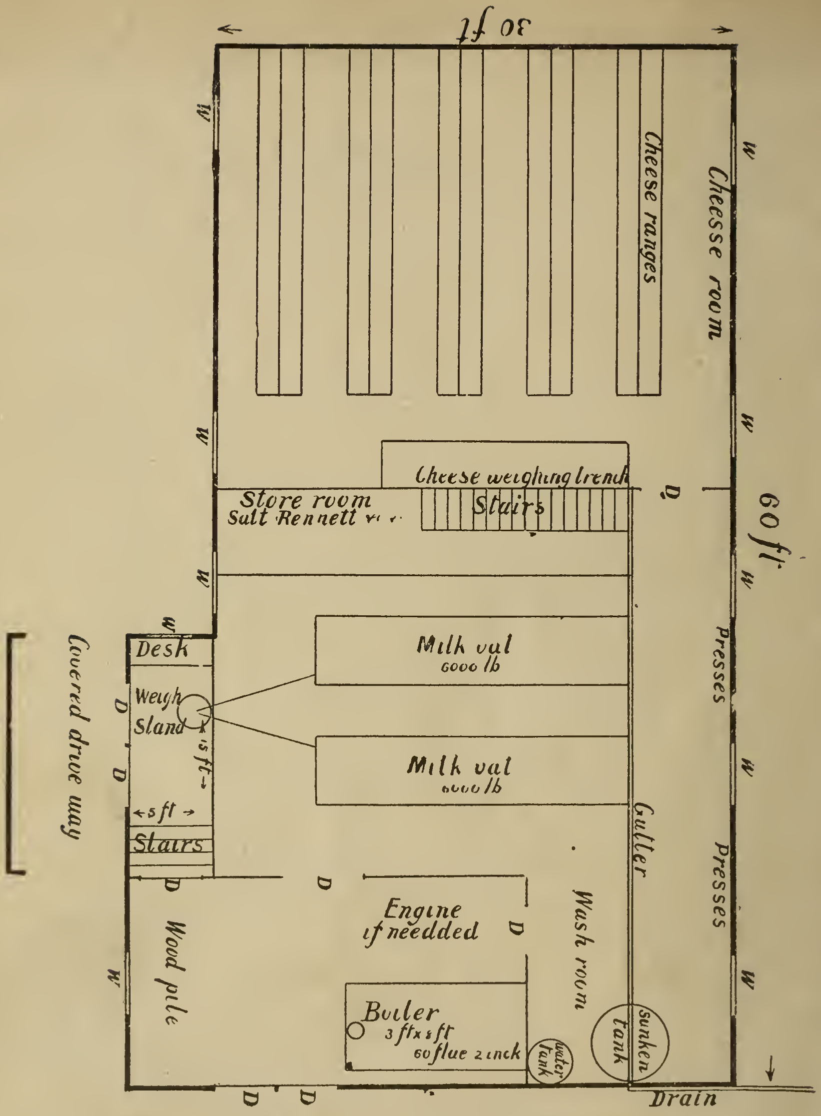
The Carthage factory is built of solid brick with four inch space between the two walls of brick. In every four rows of brick a bar of sheet iron was put from the hollow in an inside brick to the hollow in an outside brick. The inside wall is plastered on the inside, which Mr. Jack considers as good as lathing and plastering and is much cheaper. The ceilings are ten feet high, but he considers they should be eleven feet high, which would make it more "airy." There is a cellar in the cheese factory for keeping butter in. This cellar is 15 x 30 x 6′ x 10″. The owner adds: "I am strongly in favor of having a four-inch space in the brick work, as the building is always dry on the inside."

The total cost of the building was $1,069.



SILVER CORNERS' CHEESE FACTORY—PERTH CO.

This factory is owned by James Morrison, Esq., Henfryn. The make-room is 26 x 30 and built of wood. The outside is finished with dressed lumber and the inside with V-joint ash lumber. The press-room is 25 x 18 and heated with steam from the boiler. The cost of these two was $500. The curing-room is brick and plastered on the inside. It is 30 x 32 with shelf room for 800 cheese. The height of the ceiling is 9½ feet. Heating is done with a wood stove. The cost of curing-room was $450. The machinery cost $750. The total cost was $1,750. It has a capacity of 80 to 85 tons of cheese.



CHEESE FACTORY—GLENGARRY CO.

Owned by D. M. Macpherson, Lancaster.

Building 30 x 60 ft. For 500 cows. Two vats; two presses (20 cheese); one boiler 36 x 96 in., sixty 2-inch flues. Whey vats elevated over boiler room, filled from sunken tank and elevated by injector or rotary pump. Whey drops into milk cans from two-inch pipe (iron galvanized) with two outlets. A large elevated water tank is situated in the attic, above the lower water barrel. This is filled by the same injector that fills the boiler. The drain has two openings similar in size, so that the plug can be alternately used in each to let off whey or water. The cheese ranges have three tiers or shelves, and hold 400 cheese.

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BULLETIN (Special). Toronto, March, 1899.

ONTARIO DEPARTMENT OF AGRICULTURE.

INSTRUCTIONS IN SPRAYING.

SOLUTIONS RECOMMENDED.

I. Bordeaux Mixture.

Copper sulphate	4	pounds.
Lime (fresh)	4	“
Water	40	gallons.

Suspend the copper sulphate in four gallons of hot water. This may be done by putting it in a bag of coarse material, and hanging it so as to be covered by the water. Slake the lime in the same quantity of hot water.

Do not at once mix the two solutions thus made, but proceed as follows :—Put one of the solutions in the barrel, add a few pails of water, then add the other solution and bring it all up to 40 gallons. Use only fresh Bordeaux mixture, or what is not over two days old. The copper sulphate and lime solutions should not be used until required for use. Strain the solutions.

Only the best fresh-slaked stone lime should be used. If the lime is good the above amount is likely to be sufficient. It is an easy matter to know how much lime is required by using what is termed the ferro-cyanide of potassium test. This substance can be got at any druggist's, and very little is required. Take a small bottle (2 oz.) and get it filled with a saturated solution of this compound. If there is not plenty of lime in your mixture, a drop of the test added to it turns brown. Add more lime and stir. As soon as the test fails to color in coming in contact with your mixture, it indicates there is sufficient lime present to neutralize the effects of the copper sulphate. Use wooden vessels in preparing the Bordeaux mixture.

2. Ammoniacal Copper Carbonate Solution ("Cupram").

Copper carbonate	1 ounce.
Strong ammonia sufficient to dissolve the copper carbonate.	
Water	10 gallons.

This solution is not much used, and is recommended only in cases where the fruit is so far advanced that it would be disfigured by using the Bordeaux mixture.

3. Paris Green Mixture.

Paris green	1 pound.
Water	200 gallons.
Lime	16 lbs. freshly slaked.

Use 200 gallons water in a mixture for apple trees, 250 for plum trees, and 300 for peach trees.

4. Hellebore.

White hellebore (fresh)	1 ounce.
Water	3 gallons.

5. Pyrethrum.

Pyrethrum powder (fresh)	1 ounce.
Water	4 gallons.

6. Whale-Oil Soap Solution.

Dissolve 1 lb. James Good's caustic potash whale-oil soap No. 3 in 7 gallons of hot water.

7. Kerosene Emulsion.

Hard soap	½ pound, or soft soap 1 quart.
Boiling water (soft)	1 gallon.
Coal oil	2 gallons

After dissolving the soap in the water, add the coal oil and stir well for 5 to 10 minutes. When properly mixed, it will adhere to glass without oiliness. A syringe or pump will aid much in this work. In using, dilute with from 9 to 15 parts of water. Kerosene emulsion may be prepared with sour milk (1 gallon), and coal oil (2 gallons), no soap being required. This will not keep long.

8. TOBACCO DECOCTION.

Refuse tobacco	2 pounds.
Water	5 gallons.

Boil the mixture for 30 minutes or more, until a dark brown tea-colored solution is obtained. Keep it covered until cool. It may then be used undiluted for spraying infested plants.

NOTES.

1. When there is danger of disfiguring fruit with the Bordeaux mixture use the ammoniacal copper carbonate solution.

2. Experience in spraying during the past three years indicates that it is best to use the combined insecticide and fungicide, commencing as soon as the buds begin to swell, again when the leaves appear, and continue it at intervals of 10 to 15 days, until the trees have been sprayed 3 to 5 times, which will depend upon the weather. In the case of a rainy season, it may be necessary to spray at least five times, while if dry, and the mixtures have been allowed to remain on the foliage, then three or four times may be sufficient.

In no case spray while the trees are in bloom, but immediately after. It is contrary to law, and punishable by a fine of from $1 to $5.

3. The combined insecticide and fungicide, containing Paris grain and Bordeaux mixture, is to be used for insects that chew and injurious fungi, but kerosene emulsion alone for those insects that suck the juices of plants, such as aphis, thrip, red spider, clover mite, oyster-shell bark-louse, San Jose scale, etc.

4. A stock solution for the preparation of Bordeaux mixture may be prepared as follows: Dissolve 25 pounds of copper sulphate in 25 gallons of water. One gallon of this contains one pound of the copper sulphate. In another barrel slake 25 pounds of good lime, and add 12½ gallons of water. One gallon of this contains two pounds of lime. To make the mixture, take four gallons of the copper sulphate solution and two of the lime If there is any doubt about there not being sufficient lime, try the test already referred to under Bordeaux mixture. Now fill up the amount to 40 gallons with water. Add four ounces of Paris green.

5. Prepare the mixtures well, apply them at the proper time, and be as thorough as possible in the work. Three-fourths of the so-called spraying done is not spraying at all. The trees are only drenched. When spraying is properly done, the mixture is broken up like a mist and settles on every part of the plant. A great deal more of the mixture will remain on the plant when applied in this way, and there is also a saving of material, as every drop which falls to the ground is lost.

6. No mixture should be left in the pump or barrel, and, after using, clean water should be pumped so as to clean the outfit. This is important, as some of the mixtures act chemically on the metal of the pump.

7. Use a Y and two nozzles. The work can be done just as well and much more expeditiously.

8. To keep Bordeaux mixture off horses and harness use coarse linen or other cover.

9. As most of the spraying mixtures are poisonous, care should be taken in working with them. They should not be used when there is any wound or abrasion of the skin exposed, and care should be taken not to allow the spray to settle on the hands or face, or to be inhaled. Arsenites taken into the system by absorption or inhalation produce symptoms of poisoning. In mild cases they resemble the symptoms produced by poisoning; in severe cases, headaches, nausea, eruptions, boils and ulcers are said to result. The danger from arsenites, which are soluble in water, such as London purple, are much greater than from Paris green, which contains very little water-soluble arsenic. There is more danger of poisoning by absorption when perspiring freely. However, by taking proper precaution, there need be little fear. A leather washer about four inches in diameter should be fitted just below the nozzle, which will prevent the drip from reaching the hands. As far as possible keep to windward of the nozzle. When much work is to be done, rubber gloves should be worn. The face and exposed parts should be washed immediately after spraying.

10. The cost of spraying with Bordeaux mixture is not very great. Copper sulphate of the best quality (which is the only kind which should be used) can be had at from 4½c. to 5c. per lb. by the barrel, and Paris green at from 15c. to 20c. per lb. The cost for material to properly spray an average apple tree for the entire season should not exceed from 4c. to 5c.

TREATMENT.

1. APPLE.

Treatment for destroying *codling moth*, *bud moth*, *tent caterpillar*, *canker worm*, *apple spot*, *leaf blight*, *pistol case-bearer* and *powdery mildew*.

First spraying: Bordeaux mixture and Paris green (4 oz. to the barrel of the mixture) when the buds are swelling.

Second spraying: Bordeaux mixture and Paris green before the blossoms open.

Third spraying: Bordeaux mixture and Paris green when the blossoms have fallen.

Fourth and fifth spraying: Bordeaux mixture and Paris green at intervals of ten to fifteen days, if necessary.

No definite date can be named after which it would be safe to cease spraying for apple scab. The orchard should be watched after the third or fourth application, and the treatment again applied if scab appears on the fruit or leaves.

☞ Many apple growers who sprayed in 1897 until the end of June, and neglected to watch their orchards afterward, lost heavily. The scab appeared very late in the season last year, and all the experimental orchards were given an extra application in the early part of July, which largely accounts for the splendid results obtained.

We cannot always control the codling moths by spraying, especially in the northern section of Ontario where they continue to propagate long after the regular spraying season is over.

To insure a clean crop of apples, if the codling moth is bad in your orchard, in addition to spraying, use bandages around the trees. Make them from four to six inches wide, three or four inches thick, of any kind of cloth. Old bags, sacks, carpets, coarse material of any kind will do. Bands of straw and tow have been used with some success. The first week in June, bind one around each tree three or four feet from the ground ; secure it either with cord or small nails ; take it off every fifteen days and dip in hot water, or put it through an ordinary clothes wringer, which may be attached to a wheelbarrow and taken from tree to tree. Have sufficient pressure to crush all insects.

After a careful inspection in 1898 of badly infested trees, on which bandages were used, no cocoons were found except in the bandages, and in crevices of the bark under the bandages. It will take very careful inspection to find all of them, as they are carefully concealed and very much resemble the bark. All coarse, loose bark should be scraped from the trees in the early spring, as many other enemies of the apple tree harbor there also.

The first brood of moths appear about the time apple trees bloom, and begin depositing eggs as soon as the apples have formed on any part of the apple or on the leaves or stem. Each moth lays from 80 to 100 eggs. The egg laying period lasts from 8 to 12 days. The eggs hatch in from six to eight days. The larva at once makes its way into the apple, where it remains from three to four weeks, when it leaves the apple and locates in some suitable place to pass the transformation stage, which is usually under or in the crevices of the coarse bark of the tree from whence it came, but sometimes on fences, buildings, or rubbish, wherever it can find shelter. In one day it constructs a cocoon in which it enters its third or pupa stage. From this it emerges in from two to three weeks a natural moth prepared to repeat its life-history. The latter broods remain in the cocoons in the larvæ stage until the following spring.

2. Pear.

Leaf blight, *scab*, and *codling moth*, the same treatment as for the apple.

3. Plum.

Curculio, *brown rot* and *leaf blight.*

First spraying : Bordeaux mixture and Paris green before the flower buds open.

Second spraying: Bordeaux mixture and Paris green as soon as the petals have fallen.

Third spraying: Bordeaux mixture and Paris green in seven to ten days after.

Fourth spraying: Bordeaux mixture in ten to fifteen days after.

4. PEACH.

Brown fruit rot, *leaf blight*, *plum curculio* and *peach curl* (*Exoascus sp.*)

Spray at first as in case of plum, but after growth begins make Bordeaux mixture only of half strength.

Fourth spraying: Ammoniacal copper carbonate, if any danger of disfiguring the fruit with Bordeaux mixture.

In spraying peach trees for curl leaf or peach rot Bordeaux mixture full strength may be used while the tree is dormant. After growth begins use it only half strength.

5. CHERRY.

Aphis, *slug*, *brown rot* and *leaf blight.*

First spraying: Bordeaux mixture and Paris green as the buds are breaking; if *aphis* appears use kerosene emulsion alone or whale-oil soap.

Second spraying: Bordeaux mixture and Paris green as soon as the blossoms fall.

Third spraying: Bordeaux mixture and Paris green ten to fifteen days after.

6. GRAPES.

Mildew, *black rot*, *flea beetle*, and *leaf-eating insects.*

First spraying: Bordeaux mixture and Paris green when leaves are one inch in diameter.

Second spraying: Bordeaux mixture and Paris green when flowers have fallen.

Third and fourth sprayings: Bordeaux mixture at intervals of ten to fifteen days.

Paris green alone when the beetle is attacking the buds in the spring, or when the larva is attacking the leaves in summer.

7. RASPBERRY.

Anthracnose, *leaf blight* and *saw-fly larvæ.*

First spraying: Bordeaux mixture and Paris green just before growth begins.

Second spraying: Bordeaux mixture and Paris green about when first blossoms open.

Third spraying: Bordeaux mixture when the fruit is gathered.

8. CURRANT AND GOOSEBERRY.

Worms and *mildew.*

First spraying: Potassium sulphide, Bordeaux mixture and Paris green as soon as the leaves expand.

Second spraying: The same ten to fifteen days later.

For worms alone, hellebore or Paris green will be effective.

9. TOMATO.

Rot and *blight.*

Spray with Bordeaux mixture, as soon as rot or blight appears, for three times, if necessary, at intervals of ten to fifteen days.

10. POTATO.

Blight and *beetles.*

First spraying: Paris green as soon as the beetles appear (one pound to 100 gallons of water).

Second spraying: Bordeaux mixture and Paris green when plants are six inches high.

Third and fourth sprayings: Bordeaux mixture at intervals of ten to fifteen days, if necessary.

Spraying with Bordeaux mixture will prevent the blighting of the plants and the rotting of the tubers.

11. CABBAGE.

Pyrethrum applied in solution (one ounce to four gallons of water) or dusted on (one part pyrethrum to seven parts flour) for the cabbage worm.

12. STRAWBERRY.

The *rust* or *leaf-blight.*

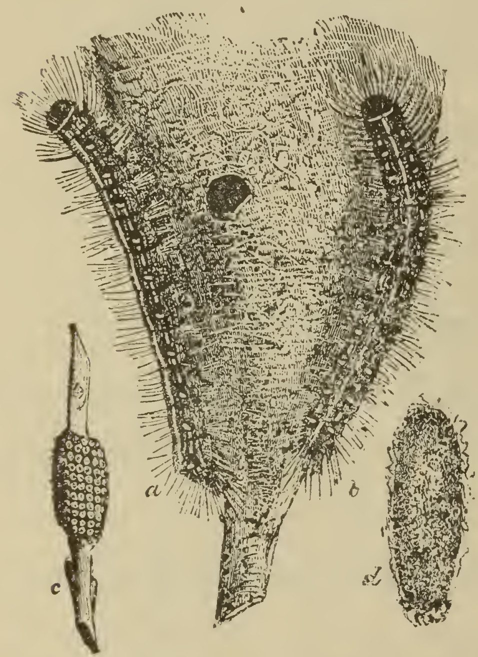
Bordeaux mixture, when it can be applied without disfiguring the fruit, will control this disease. Apply at intervals of two or three weeks on new beds after they begin to make runners.

INJURIOUS INSECTS.

The following are some of the most common injurious insects that are troublesome in the garden and orchard. To destroy these, spraying as directed will be effective. To destroy insects use only an insecticide, but if treating for a fungoid pest at the same time use a combined fungicide and insecticide.

1. Tent Caterpillars.—*Clisiocampa Americana* and *C. Sylvatica.*

Tent Caterpillar Moth.



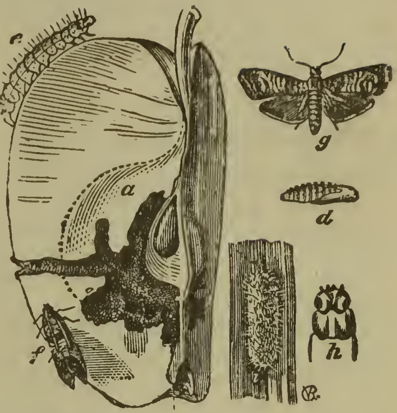
Tent Caterpillar : *a* and *b*, caterpillars ; *c*, egg cluster ; *d*, cocoon.

These insects weave large webs in the branches of the apple tree and do much damage feeding upon the foilage of the trees. They also attack the plum and cherry. The eggs—200 to 300—are laid in rings upon the twigs of the trees and can be readily seen, so that many of them might be easily destroyed during the winter. The caterpillars grow rapidly. *Americana* has a white strip down the back, and *Sylvatica* a series of white spots, and thus they are readily distinguished from each other. Both develop into brown moths. The accompanying cut represents the different stages of the insects, *C. Americana.*

Remedy.—1. Collect the egg cluster in winter. 2. Crush the "tents" when full of caterpillars. 3. Apply Paris green with lime or with Bordeaux mixture.

The young caterpillars mature in the fall and remain dormant in the egg cells during winter, whence they emerge during the first warm days of Spring. They have been discovered on the buds as early as the fifteenth of April waiting for the young leaves to appear. If the tree is sprayed with Paris green mixture at this period their destruction is almost certain.

2. Codling Moth.—*Carpocapsa pomonella.*



Codling Moth : *a*, burrow ; *b*, entrance hole *d*, pupa ; *e*, larva ; *f*, moth.

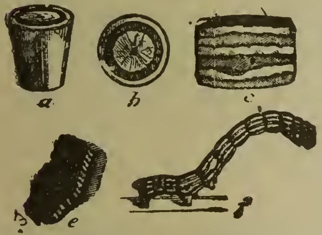
The eggs of this tiny moth are laid on the leaves and stems and sometimes on the skin of the young apple. As soon as hatched the larva burrows into the apple, where it feeds until fully developed. Affected apples fall to the ground, and often contain the worm in them. The cocoons are frequently under the bark and in other sheltered spots.

The moth appears about the time the trees are in bloom, and is one of the worst pests that attacks the apple.

When the blossoms have just fallen the calyx leaves are widely opened. It is claimed by some of the best authorities that this is our best chance to deal an effective blow at the first brood of larvæ of codling moth, which usually enter the apple at this point. The trees should be thoroughly sprayed within a week after the blossoms have fallen that a quantity of poison may rest in the calyx cup and be protected by the leaves which close up rapidly and retain it for the first meal of the larvæ. If this spraying is followed by rain it will be necessary to repeat the application.

Remedy.—1. Feed the fallen apples which may contain larva. 2. Spray with Bordeaux mixture and Paris green, as directed for the treatment of the apple.

3. Canker Worms.—*Anisopteryx vernata* and *A. pometaria.*



Canker Worm (*f*) and eggs (*a*, *b*, *c*.)

The spring canker worm was very common in 1896. Both worms are much alike, about an inch long, of a darkish brown color, slender, and move with a hoop-like motion, hence, sometimes called "measuring worms." They can drop from a tree by a silken thread.

A. vernata, the moths, appear in spring ; the female is wingless, the male is ash-colored and has wings. *A. pometaria* is much the same, but the moths appear in the fall. The wingless females in both species crawl up the trunks to lay their eggs upon the twigs.

Canker Moths : *a*, male ; *b*, female.

These insects attack the plum, cherry and apple. The accompanying cuts illustrate *A. vernata*.

Remedy—The females may be trapped by putting a band of some adhesive material around the tree.

2. Paris green is an effective remedy, as directed in the treatment of the apple, if used in time. If the worms are full grown and numerous, use six ounces of Paris green instead of four.

3. Tree collars.

4. OYSTER-SHELL BARK-LOUSE.—*Mytilaspis pomorum.*

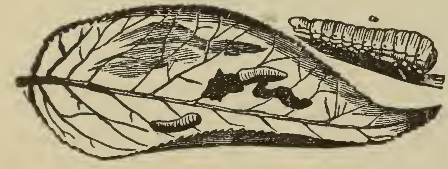
Oyster-Shell Bark-Louse.

This insect appears in the form of minute brown scale upon the bark of the apple tree, and being much the same color is difficult to distinguish. The eggs are beneath the scales. They hatch about the end of May or the beginning of June. The young lice are almost invisible; they seek the ends of the young twigs, where they become fixed, and continue to suck the juice from the twigs. Soon a scale forms over them. All scales the shape of an oyster-shell are females, and their eggs are laid under the scale. The scale of the male is more oblong and is rarely seen.

Remedy.—1. In winter, or early spring, scrape off the rough bark from the trunk and large limbs, and rub in with a scrubbing brush the following solution: One quart soft soap, or one-quarter pound hard, in two quarts boiling water; take seven parts of this and add one part of carbolic acid; then, when the young lice are moving (May or June), spray with kerosene emulsion diluted with ten parts water, or whale-oil solution.

5. PEAR TREE SLUG.—*Eriocampa cerasi.*

This insect may be found attacking the pear, plum and cherry.



Pear tree slug, various sizes.

The eggs are laid about June. The larva is about one-half inch in length and is thicker towards the head, of a somewhat greenish-black color and slimy. It has many legs. The pupa stage is spent in the ground and lasts two weeks. The imago is a small, four-winged black fly. The slug feeds on the upper surface of the leaf. It was quite common during 1896.

Remedy.—Spraying with Bordeaux mixture and Paris green, hellebore or pyrethrum, in the common proportions.

There is a second brood about the middle of July which is quite as destructive as the first brood. Spray with mixture of Bordeaux and Paris green first week in June and middle of July.

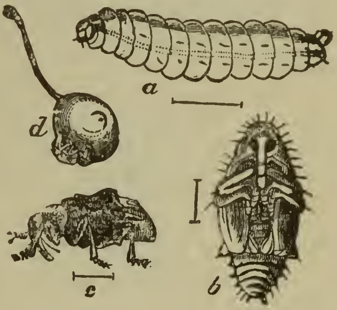
6. PLUM CURCULIO.—*Conotrachelus nenuphar.*

There is no insect better known than this little beetle. The egg is deposited in the plum, where it hatches. The affected fruit soon falls to the ground, and the larvæ leave the plums, pass into the ground, where they remain for about six weeks. The imago is a small grayish beetle, one-fifth of an inch long, with a black hump on the middle of each wing case. It has a curved snout and a stout body. The beetles hide themselves during the winter in sheltered spots, and appear in the spring about the time the trees are in bloom. This insect is also found upon the cherry, peach, and even apple. The curculio works on the fruit for about eighteen days only.

Remedy.—1. Jarring the trees morning and evening. At this time many beetles will drop and may be collected upon a sheet placed below.

2. Gather and destroy the affected plums as they fall.

3. Spray with Bordeaux mixture and Paris green as directed for the treatment of the plum. Spray once before the trees bloom, again as soon as the petals fall, and repeat about a week after.

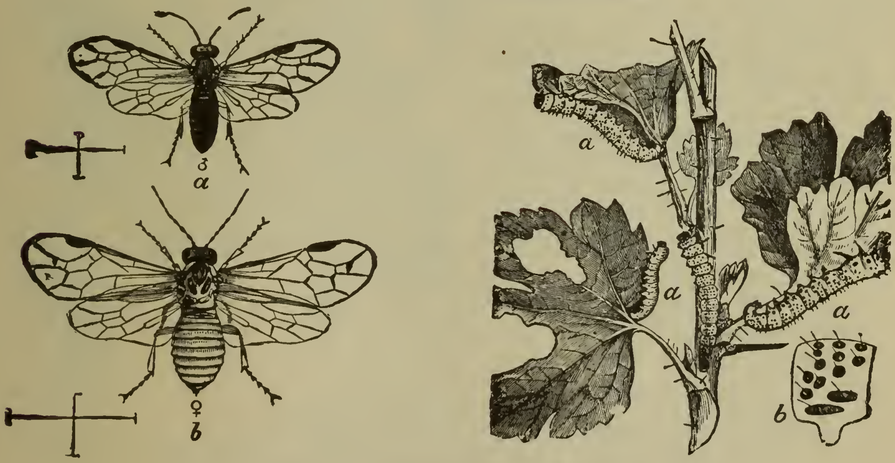


Plum Curculio: *a*, grub; *b* and *c*, beetle; *d*, egg laying on plum.

7. To Protect the Peach Tree from the Borer.

Take equal parts of hardwood ashes and fresh lime, add water until it has the consistency of paint; to this add one ounce of crude carbolic acid to each four gallons of mixture. Apply with a brush to the trees from the limbs down to where the roots join the trunk. It is necessary to clear the ground away a little to make a perfect job. Apply from 1st to 15th of June.

8. Currant Worm.—*Nematus ribesii.*



Currant Worms and the Saw Flies to which they change.

This insect is very troublesome upon currant and gooseberry bushes, It lays its eggs early in the spring, on the under side of the leaves, in rows along the veins. These hatch in about ten days, and the young worms appear. The larva, when full grown, is about three-quarters of an inch in length, of a greenish color, with dark spots, and has many legs. It spins a brown cocoon, of paper-like texture, which is found sometimes on the ground among the dried leaves, or on the bush, attached to the stems or leaves. This represents the pupa condition.

The imago appears in about two weeks after the pupa stage has been entered. The male is much smaller than the female, the body black, with some yellow spots above, while in the female the body is mostly yellow. Both have four membranous wings. A second brood is of common occurrence.

Remedies.—1. Hellebore, one ounce in three gallons of water. It may also be applied as a dry powder, mixing it with three or four parts of flour.

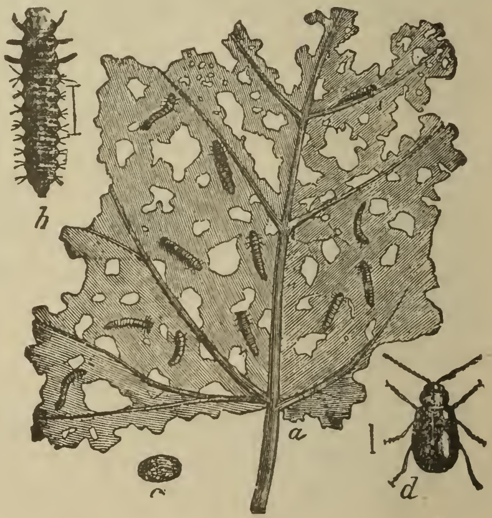
2. Paris green for the first brood, but care must be taken not to continue this if the fruit is likely to be affected.

9. GRAPE-VINE BEETLE.—*Haltica chalybea.*

The eggs are deposited on the under side of the leaves. The larva is about one-third of an inch long, brownish, with several black dots on the body. The pupa condition is passed in the ground, and continues for about three weeks.

The imago is a small, polished beetle, about one-fifth of an inch long. It passes the winter in sheltered spots, under leaves, or around the roots, and is very destructive in the spring to the young buds, and afterwards, in the larval condition, to the leaves.

Remedies.—1. Paris green, three ounces to fifty gallons of water, or combined with Bordeaux mixture (as directed under treatment of the grape.

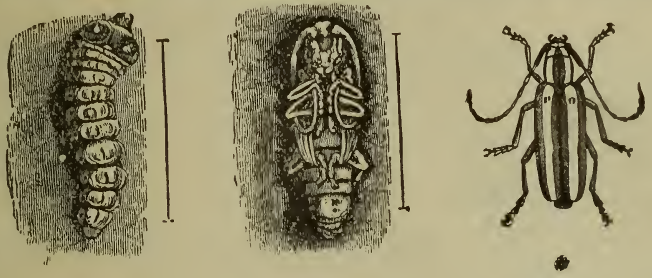


2. Dust pyrethrum powder upon the vines attacked.

3. Jarring the vines in the morning and collecting the beetles.

10. ROUND-HEADED BORER.—*Saperda candida.*

The *eggs* are deposited about June, near the base of the trunk of the apple tree. The *larva* eats its way through the outer bark to the inner, and takes about three years to develop. It works in the sapwood, where it forms flat, shallow cavities, filled with sawdust-like castings. These are often seen on the bark and indicate where the "borer" is at work. As it reaches maturity, it cuts a passage upwards into the solid wood, and then curves towards the bark. In this channel it enters the *pupa* stage about spring. When fully developed, it is an inch long, with a round head that distinguishes it from the flat-headed borer, which also affects the apple tree.

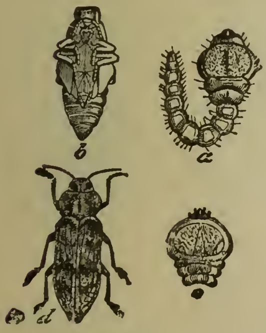


Round-headed Apple Tree Borer, *Saperda candida* : *a*, larva ; *b*, pupa : *c*, beetle.

The *imago* is a slender beetle, one inch long, with two broad, whitish stripes on the wing covers, and long jointed antennæ. It appears about June.

11. FLAT-HEADED BORER.—*Chrysobothris femorata.*

This insect also attacks the trunk of the apple tree, but lays its *eggs* higher up the tree than the preceding one. The *larva* is a pale yellow, an inch long, and has a well-marked flat head, much wider than the body. It is sometimes found even in the limbs, and is not so long in developing as the round-headed borer. It cuts flat channels in the sapwood, and sometimes girdles the tree. Castings and discolored bark indicate its presence. It finally bores into the solid wood, and becomes a *pupa* for about two weeks, and then emerges as an *imago* about half an inch long, somewhat flat, and of a greenish black color, with three raised lines on each wing-cover. The legs and under side of the body present a coppery lustre.



Flat-Headed Apple Tree Borer, *Chrysobothris femorata* Fabr : *a*, larva ; *b*, beetle.

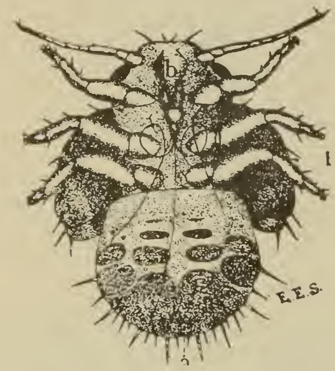
Remedies.—1. Examine the trees in autumn, and where the sawdust-like castings indicate the presence of the "borer," a stiff wire may be pushed in and the larva killed, or sometimes the larva can be cut out with a knife.

2. About the beginning of June, apply the following mixture to the trunk of the tree: One pound of hard soap, or one quart soft in two gallons of water; heat to boiling, and add one pint crude carbolic acid; make a second application in three weeks. This can be well done by using an old scrubbing-brush to rub it in.

12. THE PEAR TREE PSYLLA.—*Psylla pyricola.*

The immature insect—These curious, minute, oval, immature forms are called nymphs The newly-hatched ones are yellow in color, with crimson eyes, and can scarcely be seen with the unaided eye. During their growth they gradually acquire the black markings shown in the figure, and become tinged with red. A very conspicuous feature in the full-grown nymph is the large black wing-pads on each side of the body.

The adult insect.—In this form the insect strikingly resembles a cicada or dog-day harvest-fly in miniature. Its general color is crimson with broad black bands across the abdomen. Its thickened femora enable it to jump like a flea. In the male insect the abdomen terminates in a large trough-shaped segment from which project upward three narrow copulating organs; the end of the abdomen of the female resembles a bird's beak.



Full-grown nymph of the pear psylla, ventral view, greatly enlarged.

Remedy.—Our experiments in 1892, showed that the nymphs in all stages were quickly killed by kerosene emulsion.* Others who have tested it thoroughly report success.

Usually most of the damage is done in this State by the first brood of nymphs before June 15th. It is therefore very important that the insect should be checked early in the season. We now advise using the emulsion diluted with about fifteen parts of water, instead of with twenty-five, as it is more effective against the nymphs, and it will also kill the adult insects. As the nymphs begin to hatch just as the leaves are expanding, then is the time to begin spraying; about May 15th is usually the time in this State. Where they are numerous, a second or third spraying will be necessary. *The emulsion must be applied liberally and thoroughly;* it will not injure the tree in the least. It is much more difficult to fight the insect later in the summer, when the tree is in full foliage and many of the nymphs are covered with honey-dew. Watch for their appearance on the unfolding leaves in the spring and act promptly. Spray two or three times in a week if necessary; make every effort to prevent the development of a second brood.

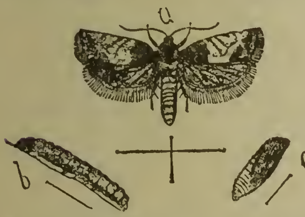
Psylla pyricola, the adult insect, much enlarged.

(*From Cornell University Agricultural Experimental Station Bulletin No. 108.)

The adults.—In Bulletin 44 we suggested that a thorough washing of the trunks and larger branches of the trees in winter with kerosene emulsion (at least five per cent. kerosene), or a strong soap solution, would destroy many of the adults in hibernation in the crevices of the bark. It is reported that a whale oil soap solution has been thus used very effectively in New Jersey. We believe it is a practical method, and should be practised in infested orchards.

13. Bud Moth.—*Tmetocera ocellana.*

This insect is found attacking both leaf and flower buds upon the apple, and sometimes proves very injurious. The half-grown *larva* winters over, and appears in spring as a small brown caterpillar, just about the time the buds begin to open, and feeds upon them. It measures about half an inch when full grown. By rolling up one side of a leaf, and securely fastening it with silken threads, it forms a tube in which it enters the *pupa* stage, having lined the little chamber with a closely woven layer of silk. This condition lasts ten days. The *imago* is a small moth, resembling the codling moth in size and form. It is of an ash-gray color. The front wings have a whitish-gray band across the middle; the hind wings are a dusty brown. The expanded wings measure half an inch across. It also attacks pear, plum, cherry, quince and peach trees, and blackberry buds.



Apple Tree Bud Moth, *Tmetocera ocellana:* *a*, moth; *b*, larva; *c*, pupa.

Remedy.—Paris green added to Bordeaux mixture as directed for the treatment of the apple.

14. The Grape-Leaf Hopper or Thrip.—*Erythroneura vitis.*

This small insect, about an eighth of an inch long, of a white color, marked by three dark bands, is sometimes troublesome on grape vines. It feeds upon the juices of the plant, and is usually upon the underside of the leaf, where it is difficult to reach in spraying.

Remedy—1. Remove fallen foliage at the close of the season, so that the insects cannot find shelter during the winter.

2. Spray with kerosene emulsion diluted with ten parts water, or with whale-oil soap solution, on the under side of the leaves in the cooler part of the day.

15. Red Spider.—*Tetranychus telarius.*

The red spider is a very small insect—a true mite—and in some places is very destructive. It sucks the juices of the plants attacked, and causes the color of the leaf to change from green to a grayish white. It flourishes in a dry atmosphere and in sunny places; shade and moisture are not favorable to its development.

Remedy.—Spray with clear water, and keep the atmosphere about the plants moist.

2. Spraying with kerosene emulsion should also be followed by good results.

16. Plant Lice.—*Aphidæ.*

Aphides are a numerous class of insects which infest many plants and trees. They injure the leaves by sucking the sap. The green aphis, *Aphis mali*, is especially injurious to the apple tree. The eggs are deposited in the autumn in cracks of the bark of the twigs and around the buds. When deposited they are a greenish color, but grow gradually darker until they are a shining black.

They hatch in the spring just as the buds are swelling, and the tiny lice locate themselves upon the buds and upon the underside of the young leaves, which soon curl over them, making it difficult to treat them. They multiply with great rapidity and cause considerable damage to the foliage and young shoots.

Remedy.—Spray with kerosene emulsion, whale-oil soap solution or tobacco decoction, as soon as the lice hatch, being careful to touch everyon- of them, as these substances kill only by contact.

17. The Clover Mite.—*Bryobia pratensis, Gorman.*

During the winter there may be seen upon the branches, around the crotches, and sometimes covering the trunks of trees, masses of rather large, round, reddish eggs. These are the eggs of the clover mite, and are very numerous in some Ontario orchards this year. The mites hatch about the month of May. Their presence on the leaves of fruit trees causes them to assume an unhealthy yellow appearance.

In Colorado and other western mountain states it is reported as one of the principal enemies of deciduous fruit trees, such as apple, pear, peach, plum, cherry, etc.

Remedy.—The eggs may be destroyed by spraying the trees in winter with kerosene emulsion diluted with five parts water. When they have hatched use any of the remedies given for plant lice.

INJURIOUS FUNGI.

The following are among the most injurious fungi that affect the products of the garden and orchard. They can be readily controlled by the proper application of Bordeaux mixture, as directed.

The usual life-history of a parasitic fungus is, that it arises from a spore which is microscopic ; this germinates and gives rise to thread-like structures which penetrate the plant upon which the fungus grows and derives its nourishment. Upon these structures in time spores are produced, as new sources from which the fungus may develop and continue to be injurious to the vitality of the plants attacked.

1. APPLE SPOT OR SCAB.—*Fusicladium dendriticum*

This fungus attacks the leaves and fruit of the apple, causing the "spots" on the fruit. The vegetative portion of the fungus is chiefly around the edge of the spots where the spores are produced in great numbers.

2. LEAF SPOT.—*Entomosporium maculatum.*

This disease attacks the pear, causing the leaves to show reddish spots with small pimples in the centre. When the fruit is attacked it cracks and appears stunted.

3. BROWN ROT —*Monilia fructigena.*

Attacks plums, cherries and peaches. The fruit affected becomes brownish at first, then shrivels and appears dried. In this condition it is termed "mummified" and is often seen upon the trees in that form. All "mummified" fruit should be gathered and burned, as they contain spores that will perpetuate the disease.

4. ANTHRACNOSE.—*Glœosporium venetum.*

This fungus appears on the canes of raspberries as small round or oval patches, with a purple border, and sometimes upon the leaves as small yellowish spots with dark border. The affected canes should be cut out and destroyed by burning.

5. LEAF-BLIGHT, OR SUNBURN.—*Sphœrella fragariœ.*

This disease produces very conspicuous spots on the upper surface of the leaves of the strawberry. The spots are reddish at first, then the centre becomes somewhat grayish. Destroy by plowing up plants after first crop or prevent and check by Bordeaux spraying.

6. POWDERY MILDEW.—*Sphœrotheca mors uvae.*

This mildew is the well-known blight on the gooseberry. It thrives in a warm, dry atmosphere, and sometimes is very destructive. At first the berries are covered with a grayish substance, and later assume a brown color. Early spraying with Boardeaux mixture will prevent.

7. Potato-blight.—*Phytophthora infestans.*

This fungus attacks the potato, commencing with the leaves and finally affecting the tubers.

8. Black-knot.—*Plowrightia morbosa.*

This fungus attacts plum and cherry trees. The name black-knot describes it perfectly.

Remedy. Cut out and burn every knot as soon as found, removing the branch two or three inches below the affected part. Make a thorough search for the knot after the leaves drop in the fall. Spray the trees with Bordeaux mixture to prevent new spores from becoming established.

9. Mildew of the Peach.

It is a fungus of the tips of shoots and young leaves. Syringe with soapsuds. Some mix lime water with the soapsuds and afterwards dust with sulphur. Good pruning and good growth are generally sufficient to prevent.

10. Yellows.

"Yellows" in peaches is a contagious disease, fatal to affected trees, and there is no known remedy but to dig out and burn root and branch.

11. Little Peaches.

A NEW DISEASE OF PEACH TREES.

A new disease of the peach, known as "little peaches," has done a great deal of damage in Michigan, and is reported from peach orchards on the Niagara River, in New York State, and some other points. The peach ceases to grow when it is about the size of a plum. The tree gradually loses vitality and dies. It is considered contagious and quite as bad as the "yellows." Remedy: Dig out and burn as soon as discovered.

THE APPLE CANKER.—STORY OF A DANGEROUS DISEASE.

The Disease Found.—At last year's meeting of the Western New York Horticultural Society, the committee on botany and plant diseases reported the prevalence of apple canker in the orchards in western New York, and a note on the subject from M. B. Waite, Washington, D. C., was read. Last spring a request was received at the Geneva Experimental Station from Chapin Brothers, East Bloomfield, N. Y., that the dying of trees in their orchards be investigated. The visit revealed the fact that, of 80 acres of once fine orchard, belonging to one of the brothers, 30 had been taken out, and one-half the remainder were not worth a shilling. Of the 45 acres originally in the the other orchard only about ten acres are left that are of any value. It is evident that this wholesale destruction is largely due to the canker. The disease has been noticed for the past six or eight years, but it has increased rapidly in the past three or four years. Twenty-Ounce is most susceptible, Baldwin, Wagener, Greening and King next. Talman Sweet seems practically free; trees on low land and on ground at all wet, suffer worst. Trees in outside rows are freer from canker than those in less exposed situations. The orchard is 40 years old, but the trees that are free from disease are thrifty and in their prime. The orchard has been cultivated far more intelligently than the average orchard. No crops have been taken, trees have been pruned regularly, and the orchard was thinned 15 years ago. It has been sprayed from the first with insecticides, but not with fungicides.

What it is.—Inquiries concerning the disease have been received from various sections of the State, and its prevalence is reported in widely separated localities. It seems to be common in most parts of the State, and in a number of instances is doing serious damage. It is also prevalent in the southern States, on the Pacific coast, in Michigan and Indiana. The swollen appearance of the limbs, the rough, blackened bark, and in many instances bare wood, black and decaying, are characteristics of this disease. The cankers are much more prevalent on mature than on young trees, the latter being evidently exempt from the attack. Old age and neglect seems to favor the disease, though thrifty trees may be ruined by its attacks.

Its Life History.—Investigations of the nature and life history of the disease were at once begun. A series of cultures were made from the diseased bark, and various forms of fungi were obtained. Two forms constantly appeared in the cultures, and led to their being separated and being grown in a pure state in test tubes. One form proved to be a toadstool that is very common on dead bark and wood in the orchard, and the other was unknown. Inoculations were made with both forms, and in a few days there was an area of discolored bark around the place of inoculation in each case where the unknown fungus had been inserted. Further inoculations were followed by the same results. By the close of the season, several of the seedlings were nearly girded with wounds three or four inches in length, while on the trees, a portion of the wood was laid bare and the dead areas of bark, characteristic of the disease, were produced. Further experiments seemed to prove that the apple canker is caused by the same fungus that produces the black rot of the apple, pear and quince. Some blighted apple twigs were examined, and it was afterward found that mature spores of the black-rot fungus were abundant on them. Some pear trees, also, which were found to be in a dying condition, were attacked by the same fungus. The spread of the disease was from the top downward. Fruit of the same fungus has, also, been found on twigs of some quince trees that grew by the side of the pear trees, although the injury was slight. The canker has also been found on a quince tree in the Experiment Station orchards, the appearance and effect being much the same as on the apple trees. The disease was also found to be abundant and doing serious damage in the large orchard of Maxwell Brothers, near Geneva. A series of experiments was undertaken to prove that this fungus occurring on these different species of trees is the same and identical with the common black rot of the fruit.

What can be done?—Strong evidence seems to be produced that a well-known fruit disease will also attack and do serious damage to the trees themselves. Black rot of the fruit of apple, pear and quince can be held in check with Bordeaux mixture, and there is no reason to think that this standard fungicide will fail in this case. Orchards that have been well sprayed with Bordeaux mixture for several years past, are much freer from the disease than those not sprayed with fungicides. The disease seems to prefer mature trees, and it lives best in the rough bark, till it gains an entrance to the cambium. By removing or preventing the formation of this bark by spraying the limbs with Bordeaux mixture, one favorite breeding place of this and possibly other plant diseases is removed. By keeping the limbs protected with Bordeaux mixture, all spores that chance to fall on them will be destroyed. Canker spots once formed cannot be cured, but such limbs should be removed wherever practicable. The rational way to combat apple canker is to spray the limbs with Bordeaux mixture as a preventive. This may be done when the trees are sprayed for apple scab, and an earlier spraying, when the growth first starts, would do no harm.

Geneva Experiment Station. W. PADDOCK.

[Paper presented to the Western N. Y. State Fruit Growers' Association, Jan. 25, 1899.]

SPRAYING OF PEACH TREES FOR THE PROTECTION OF THE BUDS AND FOR CURLED LEAF.

Showing difference in time of blossoming of whitened and unwhitened buds. (After Whitten).

Probably no other fruit grown in Ontario so often disappoints the well-grounded expectations of the orchardist as does the peach. The location may be favorable and the soil well adapted and perfectly drained; the wood may be well ripened and go into winter with abundant promise of a bountiful crop for the next season; but when the enterprising grower, endeavoring to ascertain the prospects for a crop, goes to the trees in January, February or March he often finds, on cutting open the buds, that the heart is black and dead. Not infrequently all the buds are affected in this way and the crop is a total failure. Sometimes there is vitality enough in the buds to blossom but not to set the fruit, thus cruelly disappointing the hopeful grower. This is due to the freezing of the buds after they have been stimulated into growth by a few bright warm days. Every peach grower knows that when in good condition peach buds will stand a temperature considerably below zero ; while buds which have been exposed to warm weather will be killed by a much higher temperature. Many experiments have been made to overcome this difficulty, but have been abandoned as ineffectual, or too expensive for commercial orchards. Mulching the ground under the trees, after it was frozen, so as to keep the roots dormant was tried and abandoned, when it was known that the buds would swell and even grow under certain conditions, while the roots were frozen and dormant.

The building of sheds, baling and laying down of the trees were all successful, but of no use to the grower from a commercial point of view.

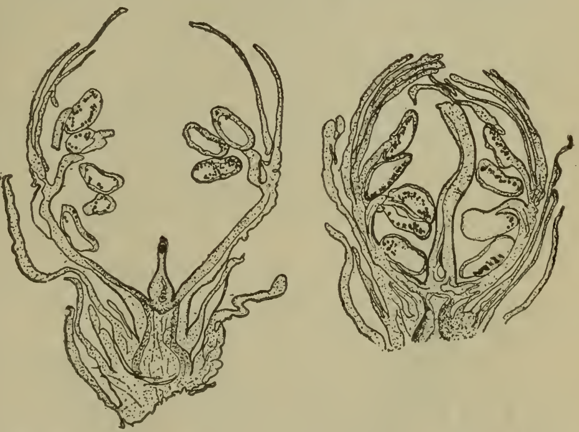
The temperature seldom rises high enough in the shade, during the winter, to stimulate the growth of the buds. The problem thus was, how effectively and cheaply could the buds be protected from the direct rays of the sun ?

With this problem yet unsolved, we heard that a series of experiments were being conducted at the Agricultural Experimental Station at Columbia, Missouri, in which the trees were whitened with a lime wash.

The theory was that whitening the trees would prevent them absorbing heat on bright sunny days, and that they would remain dormant during the winter and blossom later, thus also being less exposed to frosts in the early spring.

A test was made to ascertain the amount of heat absorbed by different colored objects of the same texture. It was found that on dull days, or when shaded, no difference existed, but when exposed to the sunlight a marked difference appeared. Frequently a difference of 10 deg. or 15 deg. was indicated, and when the sun was very bright there was 21 deg. difference between the white and purple thermometers.

The theory looked all right, and we decided to put it to the test. We selected 100 young and vigorous trees of the following varieties : Stephen's Rareripe, Wheatland, Smock, Centennial, Early Rivers and two seedlings, and gave them a good whitening, going over them twice, late in December, again in



Sections of unwhitened (a) and whitened (b) buds of Heath Cling Peach, taken March 20th, 1896, showing that the unwhitened bud had swollen and grown considerably and had an imperfect pistil, while the whitened bud was nearly dormant, and had a perfect pistil.—Whitten, Mo. Exp. Station, Bull. 38.

February and a third time in March. The material used was fresh stone lime, slacked with hot water and used as thick as it would work through a Bordeaux nozzle. One-fifth milk was added to each barrel to make it adhere to the tree. The trees were completely coated and some of the wash remained on them all summer.

The trees thus treated were later in blooming than those untreated ; but it was impossible to judge of the benefit as all the trees came through in splendid condition, and we had a fair crop, considering the very heavy crop of the previous year. However, we shall try again this winter, and our programme is as follows : In the latter part of December we will spray with the following solution : 40 gallons of water and skim milk or buttermilk, (about one fifth being milk if possible), copper sulphate 4 lbs., salt 5 lbs., and enough lime to bring the whole to as thick a mixture as will work readily in the pump. As soon as this is dry we will follow with the same mixture only omitting the copper sulphate. We will spray also early in February and early in March, using the solution without the copper sulphate. We expect that this will be all that is required, but should the coat of whitewash at any time become thin we would make an application at once.

There was a considerable amount of curl leaf on the trees in 1897, and for fear of a recurrence of the disease in 1898 we decided to treat them with Bordeaux mixture.

In April we sprayed the whole orchard excepting one side of each of three rows, and gave a second application in May. The mixture used in both cases was of standard strength and each barrel was tested with the ferrocyanide of potash test.

The application made in April while the trees were dormant caused no injury, but in May, after growth had started, it injured the twigs badly on the narrow leaved varieties, the Longhursts dropping almost all their foliage and fruit. The fallen foliage appeared perfect, the trouble being apparently with the twigs, which afterward shrivelled and died. No damage was done to broad leaved varieties.

Otherwise than the damage referred to the work was satisfactory, as the orchard was only very slightly affected, while the sides of the three rows which were not sprayed were badly diseased.

On the trees which were whitened throughout the winter in addition to the Bordeaux sprayings, scarcely a curled leaf could be found. The orchard was visited by a number of prominent fruit growers from Grimsby, Winona and other points who expressed themselves as pleased with the results.

To avoid a repetition of the damage to the foliage this year we will use only 2 lbs of copper sulphate to 40 gallons of water when we spray in April and May.

W. M. Orr.

Fruitland.

(Reprinted from the *Canadian Horticulturist.*)

SOME BENEFICIAL INSECTS.

Some insects may be classed among the friends of the fruit-grower and farmer. They feed upon some of the injurious forms of insect life—chiefly in the larval stage—and in this way they help to lessen their ravages. Among these beneficial insects are :

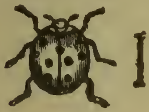


Fig. 1.

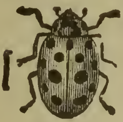


Fig. 2.

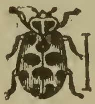


Fig. 3.

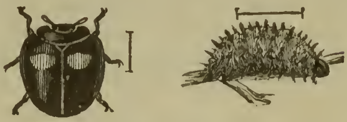


Fig. 4.

COLEOPTERA (*Beetles*).

LADY-BIRDS.—Convex, nearly hemispherical, generally red or yellow, and spotted. They feed upon small insects and the eggs of larger species, and are valuable for keeping plant lice in check, some of the varieties attacking the aphids feeding upon the leaves of the apple trees. Among the most beneficial are : Nine-spotted Lady-bird (Fig. 1), Fifteen-spotted Lady-bird (Fig. 2), Ten-spotted Lady-bird (Fig. 3), Two-spotted Lady-bird (Fig. 4), Convergent Lady-bird (Fig. 5), Comely Lady-bird (Fig. 6), Plain Lady-bird (Fig. 7). Fig. 8 represents the larval condition of the Nine-spotted Lady-bird.

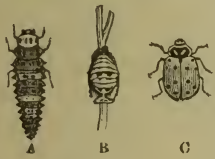
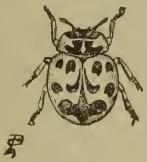


Fig. 5.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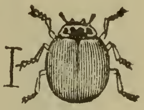
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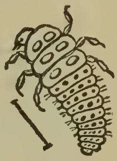
Fig. 8.

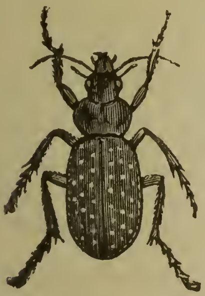
Fig. 9.

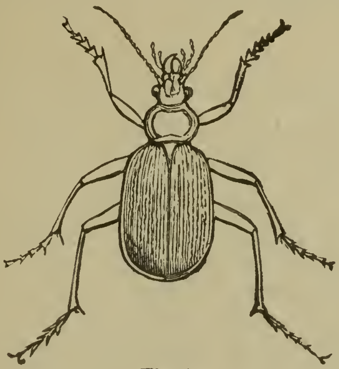
Fig. 10.

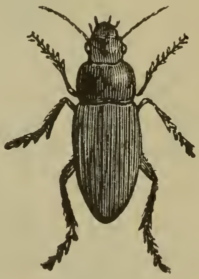
Fig. 11.

Ground Beetles.—These are found living on the surface of the ground, hiding in the ground under stones or rubbish, or running through the grass. They are valuable helpers to the orchardist, as some of them feed upon the larvæ of injurious insects, such as the pear midge, curculio, etc. Those beetles known as the Calosoma are caterpillar hunters, sometimes even climbing trees in search of their food. Two valuable species are *C. calidum*, or the Red-spotted, Glowing or Fiery Hunter, which may be easily recognized by the rows of reddish or copper colored pits on the wing covers (Fig. 9), and *C. scrutator*, or Beautiful Bodied Searcher (Fig. 10). The latter has green or violet wing covers, and the rest of the body is marked with violet, blue, gold, green and copper.

Murky Ground Beetles known as *Harpalus* (Fig. 11), and *Pterostichus* are also beneficial to the agriculturist. The former is of a pitchy black color.

Tiger Beetles (Figs. 12 and 13) are more valuable to the farmer than to the orchardist, and several species of these are quite common.

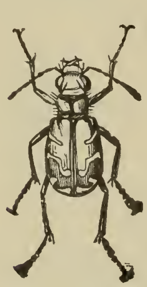

Fig. 12.

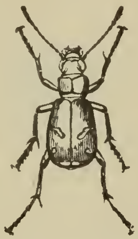

Fig. 13.

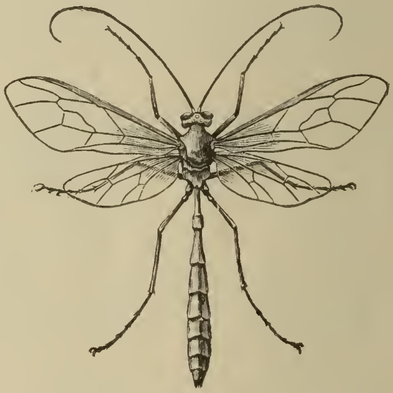

Fig. 14.

HYMENOPTERA (*Bees, Wasps, etc.*)

Ichneumon Flies.—These are our most common parasites of injurious insects, chiefly among the butterflies and moths. The various species vary much in size, some being several inches in length and others of minute form. (See Figs. 14 and 15). The most common are *Thalessa*, with a very long tail, parasitic on pigeon tremex, and *Ophion*, with yellow body, generally compressed, living on the polyphemus moth and yellow-necked caterpillar.

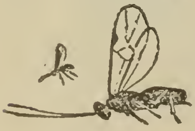

Fig. 15.

Braconids. — Sometimes also called Ichneumon flies. *Macrogaster* lays eggs in the bodies of sphinx larvæ. The larvæ develop there, and just before the caterpillar perishes they leave it and spin their white, oblong, silken cocoons on its back. These egg-like bodies, should not be disturbed, as adult Microgasters will soon emerge.

Aphidius infests plant lice, but it is too small to be readily seen.

Macrocentrus (Delicate Lace String) is parasitic on codling moth, etc. (Fig. 16.)

Chalcids or Chalcis Flies.—Small and parasitic. One species infests the cabbage butterfly, and others many troublesome larvæ.

Vespidæ or Wasps.—These may be placed among the beneficial insects, as they subsist chiefly upon injurious forms.

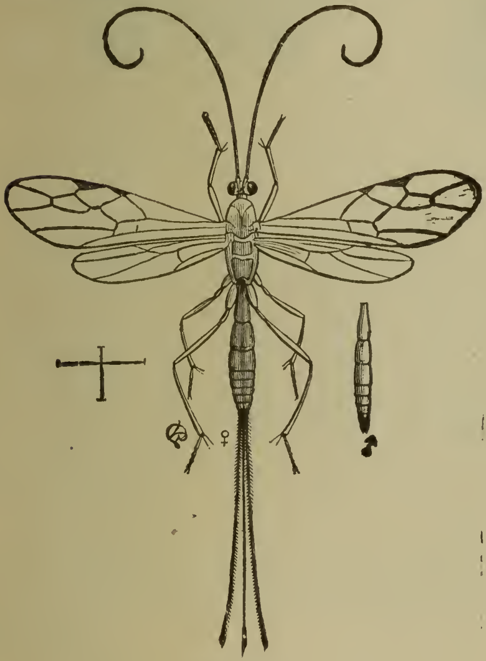

Fig. 16.

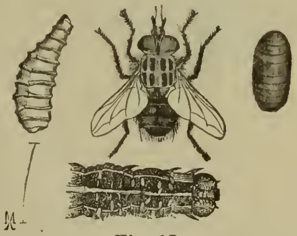

Fig. 17.

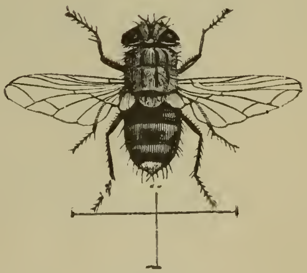

Fig. 18.

Diptera (*Flies—Two-winged*).

Tachinids.—The Tachina flies are larger than house flies. (Figs. 17 and 18.) As valuable as the Ichneumon for parasitizing caterpillars, grasshoppers, etc. Eggs are laid on the surface of caterpillars, and the larvæ bore inside. Cut worms are especially attacked by them. Many Tachina fly larvæ prey upon saw-fly larvæ. *Eristalis* preys upon aphids. *Pranachus*, with a long tapering abdomen, feeds upon clover midges.

Syrphids.—The Syrphus flies are very valuable, as their larvæ feed upon plant lice. (Fig. 19.) Some live under ground and live upon apple root-lice.

Soldier Bugs.—These are predacious on other insects. Head small, eyes prominent, beak short. Easily recognized. (Fig. 20.)

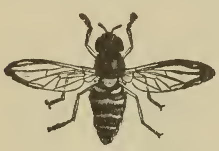

Fig. 19.

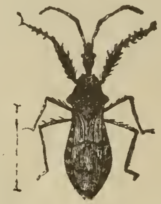

Fig. 20.

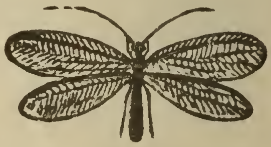

Fig. 21.

Hemiptera (*Bugs*).

Stink Bugs or Spined Soldier Bugs feed on larvæ of the potato beetle.

Neuroptera (*Four-Winged*).

The larvæ of lace wings are often found feeding on currant worms and aphids. (Fig. 21.)

Dragon Flies are also classed among the beneficial insects.

AN ACT FOR THE BETTER PREVENTION OF CERTAIN DISEASES AFFECTING FRUIT TREES.

Chap. 280, R. S. O. 1897.

1. This Act may be cited as *The Yellows and Black Knot Act, 1893.*

2. It shall be the duty of every occupant of land, or if the land be unoccupied it shall be the duty of the owner :

Duty of owners and occupants of land.

(1) To cut out and burn all black knot found on plum or cherry trees on his land so often each year as it appears on such trees ; and

(2) To cut down and burn any peach, nectarine or other trees on his land infected with the disease known as the yellows, and to destroy all the fruit of trees so infected.

3.—(1) The council of any county, city, town, township, or incorporated village, may, and upon a petition of fifteen or more ratepayers, shall by by-law, appoint at least one inspector to enforce the provisions of this Act in the municipality, and fix the amount of remuneration, fees or charges he is to receive for the performance of his duties, and in case a vacancy shall occur in the office of inspector, it shall be the duty of the council to fill the same forthwith ; and the council (in any municipality where peaches are grown) shall also by by-law appoint three or more persons resident in the municipality, who shall constitute a board of fruit tree inspection, to which appeals shall lie from the order or decision of the said inspector.

Appointm of inspectors and board of fruit tree inspection.

(2) The council may pass a by-law dividing the municipality into such sections or divisions as may be necessary for the carrying out of this Act, and may appoint inspectors for such divisions whose duties and powers shall in all respects be the same as that of the township inspector.

(3) Where an inspector is appointed by a county council, his duties shall be to aid the local inspectors in enforcing the provisions of this Act, and where no local inspector is appointed by a municipality the inspector appointed by the county council shall have all the powers of a local inspector within such municipality.

Duties of county inspector.

4. If written complaint be made to the inspector that yellows or black knot exists within the municipality, in any locality described in such complaint, with reasonable certainty, he shall proceed to examine the fruit trees in such locality, and if satisfied of the presence of either disease he shall immediately give notice in writing to the owner or occupant of the land whereon the affected trees are

Inspector to proceed upon written complaint.

growing, requiring him within ten days from the receipt of the notice to deal with such trees in the manner provided by section 3 of this Act.

Inspector to ascertain and report as to existence of diseases.

5.—(1) It shall be the duty of every inspector appointed under this Act, by personal inspection, to ascertain from time to time whether either of the diseases mentioned in this Act exists in the municipality, and to report thereon at least once a year to the municipal council, and wherever he is satisfied of the presence of either disease he shall proceed in the same manner as in case of a complaint made under section 4 of this Act.

Report to Minister of Agriculture.

(2) A copy of the annual report of the inspector shall be forwarded by the clerk of the municipality to the Minister of Agriculture.

Appeal to board of fruit tree inspection.

6.—(1) An owner or occupant to whom notice regarding yellows has been given by the inspector, under section 5 of this Act, may appeal therefrom, within the ten days limited therein, to the board of fruit tree inspection of the municipality.

Notice of appeal.

(2) The owner or occupant so appealing, shall, within the said ten days, give notice in writing to the inspector that he requires an examination of the trees, in respect of which complaint is made, by the board of the fruit tree inspection, and shall name the day and hour at which the examination will take place.

Notice to board to attend and examine trees.

(3) The person appealing shall also within the said ten days give notice in writing to three members of the said board that he requires the attendance of the members notified at the time and place named for the examination of the said fruit trees, and the date so fixed shall be not less than three days after the service of notice on the inspector and on the last member of the board so served.

Examination by board.

(4) At the day and hour named in the notice of appeal, the members notified shall attend and examine the trees in question and determine whether or not the notice given by the inspector to the owner or occupant, under section 5 of this Act, was rightly given, and the decision of the said board or of a majority of the members present shall be final.

Decision by board.

(5) The decision of the board shall be in writing, signed by the members agreeing thereto, and a duplicate thereof shall be given to the person appealing and to the inspector, and pending such decision all proceedings against the owner or occupant appealing shall be stayed, and if the said board decides that the notice given by the inspector was wrongly given and was unnecessary no further proceedings shall be taken thereon.

(6) Each member of the said board shall be entitled to receive $2 for every examination made by him under this section, and the same shall be paid by the owner or occupant appealing if the board decides that the notice of the inspector was rightly given, or by the municipality if the board decides that such notice was wrongly given, and the amount of said fees shall be stated in the written decision of the board, and shall be a debt due to the board from the party so found liable, recoverable in any division court having jurisdiction.

Fees of board.

7.—(1) Any owner or occupant of land who, after notice given by the inspector, as provided by section 4, suffers any black knot to remain on plum or cherry trees, or keeps any peach, nectarine or other trees infected with yellows or the fruit of trees so infected, shall upon conviction, be liable to a fine of not less than $5 and not more than $20 for every such offence.

Penalties.

(2) Any person who knowingly offers for sale or shipment, or sells or ships the fruit of trees infected with yellows, shall, upon conviction, be liable to a fine of not less than $5 nor more than $20.

(3) Every inspector who, after receiving the written complaint required by section 4, of this Act, refuses or neglects to discharge the duties imposed on him by this Act, shall, upon conviction, be liable to a fine of not less than $10 nor more than $20.

8.—Every offence against the provisions of this Act shall be punished, and the penalty imposed for each offence shall be recovered and levied, on summary conviction, before any justice of the peace; and one-half of every fine imposed shall be paid to the inspector or other person laying the information, and one-half to the treasurer of the municipality in which the offence is committed, for the use of the municipality.

Application of penalties.

9.—The council of every municipality shall require its inspector or inspectors to faithfully discharge all their duties under this Act.

Council to require inspectors to perform their duties.

ACT FOR THE PROTECTION OF INSECTIVOROUS AND OTHER BIRDS.

CHAP. 289, R. S. O. 1897.

HER MAJESTY, by and with the advice and consent of the Legislative Assembly of the Province of Ontario, enacts as follows:—

Rev. Stat. c. 287 not affected.
Cage birds and poultry.

1. Nothing in this Act contained shall be held to affect *The Ontario Game Protection Act*, or to apply to any imported cage birds or other domesticated bird or birds generally known as cage birds or to any bird or birds generally known as poultry.

Birds that may be killed.

2.—(1) Except as in section 6 of this Act provided, it shall not be lawful to shoot, destroy, wound, catch, net, snare, poison, drug, or otherwise kill or injure, or to attempt to shoot, destroy, wound, catch, net, snare, poison, drug or otherwise kill or injure any wild native birds other than hawks, crows, blackbirds and English sparrows, and the birds especially mentioned in *The Ontario Game Protection Act.*

(2) Any person may, during the fruit season, for the purpose of protecting his fruit from the attacks of such birds, shoot or destroy, on his own premises, the bird known as the robin without being liable to any penalty under this Act.

Trapping and selling forbidden.

3. Except as in section 6 of this Act provided, it shall not be lawful to take, capture, expose for sale or have in possession any bird whatsoever, save the kinds hereinbefore or hereinafter excepted, or to set wholly or in part any net, trap, spring, snare, cage, or other machine or engine, by which any bird whatsoever, save and except hawks, crows, blackbirds, and English sparrows, might be killed and captured; and any net, trap, spring, snare, cage or other machine or engine, set either wholly or in part for the purpose of either capturing or killing any bird or birds save and except hawks, crows, blackbirds and English sparrows, may be destroyed by any person without such person incurring any liability therefor.

Nest, young or eggs not to be taken.

4. Save as in section 6 of this Act provided, it shall not be lawful to take, injure, destroy, or have in possession any nest, young, or egg of any kind whatsoever, except of hawks, crows, blackbirds, and English sparrows.

5. Any person may seize, on view, any bird unlawfully possessed, and carry the same before any justice of the peace, to be by him confiscated, and if alive, to be liberated; and it shall be the duty of all market clerks and policemen or constables on the spot to seize and confiscate, and if alive, to liberate such birds.

Power to seize birds unlawfully possessed.

6. The chief game warden for the time being under *The Ontario Game Protection Act*, may on receiving from any ornithologist, or student of ornithology, or biologist, or student of biology, an application and recommendation according to the forms A and B in the schedule hereto, grant to such an applicant a permit in the form C in said schedule, empowering the holder to collect, and to purchase, or exchange all birds or eggs, otherwise protected by this Act, at any time or season he may require the same for the purposes of study, without the liability to penalties imposed by this Act.

Permit may be granted by chief game warden to ornithologists, etc.

7. The permits granted under the last preceding section shall continue in force until the end of the calendar year in which they are issued, and may be renewed at the option of the chief game warden for the time being under *The Ontario Game Protection Act.*

Duration of permit.

8.—(1) The violation of any provision of this Act shall subject the offender to the payment of not less than one dollar and not more than twenty dollars with costs, on summary conviction, on information or complaint before one or more justices of the peace.

Penalties.

(2) The whole of the fine shall be paid to the prosecutor unless the convicting justice has reason to believe that the prosecution is in collusion with and for the purpose of benefitting the accused, in which case the said justice may order the disposal of the fine as in ordinary cases.

Application of fines.

(3) In default of payment of the fine and costs, the offender shall be imprisoned in the nearest common gaol for a period of not less than two and not more than twenty days, at the discretion of the justice.

9. No conviction under this Act shall be quashed for any defect in the form thereof, or for any omission or informality in any summons or other proceedings under this Act so long as no substantial injustice results therefrom.

Conviction not invalid for want of form.

AN ACT FOR THE FURTHER PROTECTION OF BEES.

Chap. 282, R. S. O. 1897.

Use of poison in spraying fruit trees in bloom prohibited.

1. No person in spraying or sprinkling fruit trees, during the period within which trees are in full bloom, shall use or cause to be used any mixture containing Paris green or any other poisonous substance *injurious to bees.*

Penalties.

2. Any person contravening the provisions of this Act, shall, on summary conviction thereof before a justice of the peace, be subject to a penalty of not less than $1 or more than $5, with or without costs of prosecution, and in case of a fine or a fine and costs being awarded, and of the same not being upon conviction forthwith paid, the justice may commit the offender to the common gaol, there to be imprisoned for any term not exceeding thirty days unless the fine and costs are sooner paid.

DO NOT SPRAY TREES WHEN IN FULL BLOOM.

1. It is not the right time to spray.
2. It may destroy insects that are then fertilizing the blossoms.
3. It is destructive to bees.
4. It is forbidden by law.

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Ontario Department of Agriculture

ONTARIO AGRICULTURAL COLLEGE

SPECIAL BULLETIN

Debates, Plays and Community Music

FOR

Rural Social Organizations

BY

O. J. STEVENSON, M.A., D.Paed.
Professor of English

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TORONTO, ONTARIO, MAY, 1922

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Ontario Department of Agriculture

ONTARIO AGRICULTURAL COLLEGE

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INTRODUCTION

There are in Ontario many rural organizations whose members engage in literary and social activities with a view to self-improvement. In the case of the Literary Society and similar organizations, as a general thing the sole purpose is self-improvement, and the chief work of the executive is to provide literary and musical programmes. Suggestions as to the organization and work of the Rural Literary and Debating Society are contained in a separate bulletin.

In the case of certain other organizations the chief purpose is recreation and social intercourse. These clubs or societies in many cases meet from house to house and their programmes are more general and more varied. The following are a few suggestions as to the character of the recreation or of the programmes that may be provided, according to the size of the organization, the place of meeting, and the interests of its members:—

1. Charades.
2. Tableaux; shadowgraphs; "living pictures."
3. Spelling matches; geography matches.
4. Old-fashioned games.
5. Carpet balls, checkers, crokinole, and other games.
6. Singing contests; story-telling contests.
7. A Dickens' party; an historical party,—in costume.
8. Programmes for special days: Valentine Day, Hallowe'en, Thanksgiving Day.
9. A Canadian, Scotch, Irish or English Night.
10. Mixed programmes, with music and speeches: A good reader reads aloud at each meeting a chapter from an interesting book such as "The Friendly Road," by David Grayson.
11. An Evening with the Stars. One or two short papers on some of the constellations, followed, if possible, by observation with field-glasses or telescope.
12. Study of an artist such as Turner or Reynolds, with reproductions or lantern slides; or of a composer, with phonograph records to illustrate.
13. A motion picture or lantern slide entertainment.
14. A Mock Trial.
15. A Debate.
16. A Play.
17. Community Music.

The Packet Library, Ontario Agricultural College, will give assistance, where possible, in providing material for programmes; and will appreciate suggestions and information as to programmes and entertainments that have been successfully carried out by rural organizations.

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Among the most attractive forms of work in which Rural organizations engage are the holding of debates, the presentation of plays, and community singing; but in each case there are certain difficulties which have to be overcome.

In the case of Debates very often there is no member of the organization who knows what arrangements to make or what rules should be followed; and the debaters themselves, in many cases, fail to present their arguments effectively because they do not know how to organize their material. And furthermore, even where a debate might otherwise be carried out successfully, it is sometimes impossible for the debaters to find a suitable subject. It is hoped that the suggestions and the lists of subjects contained in the following pages will be of some assistance to rural organizations in overcoming these difficulties.

In the case of Plays the greatest difficulty is the selection of a play that is suitable for amateurs. The following bulletin contains a list from which a choice may be made, and some directions and suggestions are given as to the performance of a play.

In the case of community music, the bulletin contains suggestions as to different forms of community music, and information as to where material for use in community singing may be obtained.

I—DEBATES

Preliminary Arrangements. Arrange for two speakers on each side, and secure three judges to decide the debate. Provide chairs and tables for the debaters, and if possible provide tables, pencils, and paper for the judges. Before the debate begins, the chairman calls upon the speakers for the affirmative to occupy the chairs at his right, and the speakers for the negative to occupy those on his left.

Rules of Debate. It is usual to allow twelve minutes for each speaker, and an additional four minutes to the leader of the affirmative, to enable him to refute the arguments of the negative. During the concluding speech he is not permitted to bring forward any new arguments. The chairman should warn each speaker by signal one or two minutes before his time is up. The speaker should stop promptly on the final signal, even if he is in the middle of a sentence. During the debate all personalities must be avoided. A speaker should not refer to other speakers by name, but should, for example, speak of "the leader of the affirmative," "the second speaker of the negative," "my colleague," "our opponents," etc.

Organization of Material. A well organized speech consists of four parts. (1) Statement of the proposition, or subject, for debate. (2) Introduction. The speaker explains the wording of the proposition, if necessary, and states the line of argument that he intends to follow. (3) Discussion. The speaker confines himself usually to three or four clear-cut arguments, with evidence to support them. (4) Conclusion. The speaker sums up his arguments and concludes with a re-statement of the proposition.

Rebuttal. In preparing the debate, each side should try to anticipate the arguments of their opponents, and be prepared to refute them. Before presenting their own arguments the speakers on the negative should reply briefly to the points brought forward by the affirmative.

Argument and Evidence. Debaters should bear in mind that no argument can carry weight unless supported by satisfactory evidence and unless the reasoning is sound:

(a) Mere statements as to the speaker's own opinion are not evidence. If you put forward an argument you must produce proof in support of it, and if you make a statement of facts you must briefly cite your authorities and show that they are reliable. It is, however, better to refer to one or two authorities whose reliability you can establish, than to make too many references.

(b) Conclusions must follow logically from the facts presented. In general, you cannot base a conclusion on a single instance. Are your facts of such a nature as to justify the conclusion you have drawn? And does your conclusion necessarily follow from the facts?

(c) Mere statements of weakness in the case of the opposing side do not constitute arguments. Your arguments should be constructive.

Debate Outline. The following brief outline of a debate on Consolidated Schools will serve as an illustration of some of the points that have been mentioned. In the case of the opening speech of the leader of the affirmative, the introduction and conclusion of the speech are given; but the arguments throughout the debate are merely outlined.

LEADER OF THE AFFIRMATIVE. The subject for debate is, "Resolved that it is in the interests of rural communities in Ontario to establish consolidated schools to take the place of the existing sectional schools."

By Consolidated Schools we mean rural Public Schools which are maintained jointly by the ratepayers of two or more school sections, and which have been established under the provisions of the Consolidated Schools Act. My colleague and I will try to prove to you that these schools are so much superior to the existing sectional schools that it would be in the interests of rural communities to establish them. We will admit at the outset, that there may be certain communities in Ontario in which, because of their geographical position, the establishment of consolidated schools would be inadvisable. But these are special cases and do not affect the general principle which we wish to establish.

In general, the success of any school depends upon four or five important factors,—administration by a competent board of trustees, the character of the school plant and equipment, the teacher, the organization of the school, the courses of study, and the methods of teaching. I will attempt to show you the advantages of the Consolidated School over the existing sectional schools with respect to administration, school plant and equipment, and teaching staff. My colleague will discuss the organization, courses of study, and methods of teaching.

Arguments (in outline only):—

1. Administration. Consolidated School Board of five trustees, compared with Sectional Boards. Better choice of trustees chosen from a wider area. Free from the petty influences of the small section.

2. School plant. Better building, with better heating and ventilation, sanitary conveniences. Larger school grounds and gardens. Better playgrounds. (See Regulations.)

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Equipment. Inferior equipment of one-roomed schools. Equipment of consolidated school includes piano, phonograph, moving picture machine, good library and better apparatus.

3. Teachers. Consolidated schools pay better salaries and can attract and hold better teachers. The principal must hold a first-class certificate (see regulations.) Teachers do not change so frequently as in one roomed schools.

Summing Up. Before I conclude I wish to sum up the arguments I have advanced. I have tried to show you: First, that the educational interests of your community are better looked after by a board of five trustees elected at large from the consolidated school area than by three or four sectional school boards.

Second. That the school plant, including buildings and ground, and the equipment of a Consolidated School, are much superior to those of sectional schools, and that the health and progress of the pupils are benefited as a result.

Third. That the Consolidated School is likely to attract better teachers than the single-roomed school, and that teachers are likely to be more permanent. A constant change of teachers is detrimental to the progress of the pupil.

I beg to submit these arguments for the consideration of the judges, and I thank the audience for the attention they have given me.

LEADER OF THE NEGATIVE. Introduction. Aim of the Negative. Rebuttal of opponent's arguments. Outlines of case for the negative.

Arguments:

1. Sectional schools in closer touch with the people. Trustees know the needs of the section. Teacher knows the parents and the home life of the pupils.

2. Sectional schools less expensive to maintain than Consolidated Schools. Cost of buildings. Cost of transportation. Why "scrap" existing school buildings?

3. The walk or drive to the sectional school is preferable to transportation to the consolidated school in vans. Length of the journey in vans. Careless drivers. Lack of supervision of pupils in the vans.

4. The environment of the sectional school is more wholesome than that of the Consolidated School. In the village the pupils frequent the village stores, post-office, garages and streets. In the case of the single-roomed country school the surroundings are ideal. A word picture of the ideal rural school.

Summing up and conclusion.

SECOND SPEAKER ON AFFIRMATIVE. Introduction. Rebuttal. Outline of points to be dealt with.

Arguments:

1. The Organization of the school. The Consolidated School is a graded school. Each teacher a specialist in the work of her own grade. Pupils receive more instruction and take more interest in their work. No waste of time, as in ungraded schools. Fifth classes enable farm boys to continue at school after passing the Entrance. Attendance at Consolidated School much more regular than in ungraded chools. Picture the single-roomed school with a few pupils, kept up eavy expense to the section.

2. Courses of Study and special features. Special provision made for teaching manual training, domestic science (including sewing), agriculture (with school garden), music, and art, in Consolidated Schools. Show the great advantages of these subjects.

Special features: Organized play; Medical and dental inspection; Kindergarten-primary classes.

3. Methods of Teaching better in Consolidated Schools because of better teachers, better equipment, and more time for each class.

Summing up, and conclusion.

SECOND SPEAKER OF NEGATIVE. Introduction. Rebuttal. Outline of points to be dealt with.

Arguments:

1. In the Sectional School the pupil can be given individual attention, which is not possible in the larger school. Enlarge on this.

2. In the Sectional School the pupil learns self-reliance. He learns to work out problems for himself. In the large class in a graded school there is a deadening uniformity.

3. Tendency of Consolidated Schools, in the village, to wean pupils away from country life. The work of the graded school has this tendency.

4. The experience of the past. A word picture of what the small school has done, and the fine types of men and women it has turned out. If supplied with good teachers and good equipment it will still answer its purpose.

Summing up and conclusion.

LEADER OF THE AFFIRMATIVE. Rebuttal, and close of the debate.

Points for Debaters. Organize your material. Clearness is the first essential of a good speech. Memorize only the beginning and the conclusion of your speech. Speak distinctly. Look your audience in the face and try to convince them. Avoid long pauses, and try to put some life into your speech. Use simple language. In preparing your speech consult a dictionary and be sure to pronounce your words properly. Avoid long quotations and long lists of figures. Do not mistake humour for argument. Remember that your arguments must be supported by proof or evidence. Sum up your arguments briefly. The three deadly sins of debaters are, lack of organization, lack of clearness and lack of animation.

Judging a Debate. Judges must be unprejudiced and must always bear in mind that their duty is to judge the merits of the debate and not the merits of the question debated. In the case of most subjects, one side is more popular with the audience than the other, but the judges must not allow the feelings of the audience or their own personal opinions to affect their decision.

In judging a debate it is usual to allow 60% for arguments and 40% for language and delivery. Judges must not allow themselves to be carried away by the fluency or lively manner of a speaker, unless at the same time he presents sound arguments, supported by satisfactory evidence. On the other hand, a mere array of facts, figures, and quotations, is not in itself sufficient to win a debate.

It is better for the judges not to try to judge by "points." It is safer for them to try to form an impression of the speech as a whole; but in forming their judgment, in the case of each speaker, they should give due consideration to the following:—

On the Side of Argument:—

- (a) Thoroughness of preparation.
- (b) Organization of material. Has the speech a distinct beginning, middle, and ending?
- (c) Soundness of the argument and reliability of the evidence.
- (d) Skill in rebuttal. Have the main arguments of the opposing side been answered?

On the Side of Form:—

- (a) Delivery: The debater's ability to speak "from his feet," without memorization of his speech; ease of manner; fluency; distinctness; tone of voice.
- (b) Language: Choice of words; freedom from grammatical errors.
- (c) Manner: Sincerity and earnestness. Flippancy, "smartness," and mere "noise" should be severely penalized.

If preferred, before giving their decision the judges may retire to discuss the merits of the debate; but usually at the close of the debate each judge without consulting his colleagues merely writes "affirmative" or "negative" on a slip of paper and hands it to the chairman, who examines the ballots and announces the decision.

Subjects for Debate. The following is a list of miscellaneous subjects, intended for Junior Farmers' Improvement Associations, Women's Institutes, Community Clubs, and other rural organizations. Some of the subjects that are commonly debated by rural organizations are hackneyed and not likely to arouse much interest; other subjects are trivial or foolish, and not worth serious discussion. In the preparation of the following list an effort has been made to provide a variety of subjects. Some at least are new, and some of them are very closely related to the interests of the rural community.

Subjects for Debate

1. That mixed farming is more profitable than special farming in this community.
2. That steam is of greater value to mankind than electricity.
3. That Eastern Canada offers greater opportunities to the farmer than Western Canada.
4. That Canada is of more importance to Great Britain than is Australia.
5. That a course in a business college is of more value to a girl than a course in domestic science.
6. That the country affords better opportunities for the development of the mind than does the city.
7. That exhibitions do more to develop agriculture than do agricultural colleges.
8. That the school exerts greater influence in moulding character than does the home.
9. That the Canadian form of government is preferable to that of the United States.
10. That investment in sheep is more profitable than investment in dairy cattle.
11. That a consolidated school should be established in this community.
12. That the farmer with 100 acres of good land (including a thousand dollars' worth of implements and stock) is in a better financial position than the city man with a salary of $2,000.

13. That one member of each rural board of school trustees should be a woman.
14. That light breeds of fowl, such as Leghorns and Anconas, are more profitable than heavy breeds, such as Plymouth Rocks.
15. That the Senate should be abolished.
16. That hardwood floors in the farmhouse are preferable to rugs or carpets.
17. That it is more profitable for the farmer's wife to keep bees than to raise poultry.
18. That the farmer's wife has fewer opportunities to enjoy life than the farmer.
19. That conditions in farming communities fifty years ago were more conducive to happiness than conditions at the present time.
20. That the clothing of both sexes should be standardized.
21. That children should not be taught myths and fairy stories.
22. That the city depends upon the country to a greater degree than the country depends upon the city.
23. That the sale and distribution of milk in towns and cities should be undertaken by the municipal authorities for the benefit of the public.
24. That the diet of human beings should not include meat.
25. That Public and High School education should be supported by a tax levied on the Province as a whole.
26. That the reading of magazines and newspapers is of more value than the reading of books.
27. That basketball is a better game than football.
28. That it is more profitable to raise chickens by the use of incubators and brooders than by means of sitting hens.
29. That municipal government by paid commissioners would be preferable to the present system of government by municipal councils.
30. That it is, on the whole, of greater advantage to the farmer to purchase his goods from a local dealer than from a departmental store through the mail-order system.
31. That the single tax system is preferable to our present system of taxation.
32. That the publication of news relating to crime is not in the public interest.
33. That the drift to the city is due to economic rather than to social conditions.
34. That capital punishment should be abolished.
35. That it would be a benefit to rural education if all public schools in this inspectorate were placed under the control of a single board of trustees.
36. That the Canadian Government should own and control all telegraph and telephone systems in the Dominion.
37. That it would be to the advantage of the farming community if a co-operative laundry were established in each municipality.
38. That the holding of school concerts or public entertainments in which school children take part, is not in the best interests of the school.
39. That the drift of population from the country to the city has not thus far been a detriment to agriculture in Ontario.
40. That the Province should supply free text-books to all children in the Public Schools.
41. That the country affords better opportunities for social enjoyment than the city.

42. That it is of greater advantage to an individual to be gifted with musical talent than with the power of oratory.
43. That weeds are a greater source of loss to the farmer than are insect pests.
44. That Western Canada (West of Ontario) has contributed more to the prosperity of the Dominion during the last fifty years, than has Eastern Canada.
45. That wealth is a greater source of unhappiness than is poverty.
46. That modern labour-saving devices have done more to lighten the work of the farmer than to reduce the drudgery of housework in the farmhouse.
47. That it is in the interest of the country at large that provincial highways should be established in Ontario.
48. That voting should be made compulsory.
49. That attendance at an Agricultural College for two years is of greater value to a young farmer than $1,000 spent in travel.
50. That a Community Hall should be established in this municipality.
51. That it is better for a girl to engage in domestic service than to work in a factory or an office.
52. That compulsory vaccination is in the interests of public health.
53. That a school garden should be established in connection with every rural school.
54. That the Italians are more desirable as immigrants than the Chinese.
55. That homework should not be given to boys and girls in the Public School.
56. That the advancement of a country depends more upon its natural resources than upon its people.
57. That it would be in the public interest if a daylight-saving bill were passed for Canada.
58. That corporal punishment is never justifiable.
59. That trial by judge is preferable to trial by jury.
60. That military training should be made compulsory for all boys in Public and High Schools.
61. That the Public Library should be kept open on Sundays.
62. That Russia is destined to become a greater world power than Japan.
63. That the introduction of phonetic spelling would be to the advantage of the Anglo-Saxon peoples.
64. That competition has done more for the prosperity of the farmer than has co-operation.
65. That it is preferable to be short rather than tall. (Humorous).
66. That the inventor has done more to promote human happiness than has the legislator.
67. That Asiatics should be excluded from Canada.
68. That a sales tax of at least 50% should be levied upon tobacco.
69. That the life of the farmer is preferable to that of the city man who works for a salary.
70. That flies are a greater source of danger and loss to the farmer than other insect pests on the farm.
71. That the steam-engine has done more for the development of Canada than has the printing press.
72. That the pioneer woman contributed more to the welfare of the home and the community than does the modern woman.
73. That it would be to the advantage of the country at large if a special tax were placed upon bachelors. (Humorous).

74. That a system of proportional representation should be adopted for Provincial and Dominion elections.
75. That Canada possesses greater natural resources than the United States.
76. That all theatres and moving picture exhibitions should be controlled and operated by the government.
77. That observation is a more important factor in education than reading.
78. That the optimist is of greater service to mankind than is the pessimist.
79. That betting in any form should be prohibited by law.
80. That poor relations are a greater trial than rich relations. (Humorous).
81. That the personal income of an individual should be limited to $5,000 a year.
82. That one church in each community should be the community centre, and should provide a club-room for the use of members.
83. That party government is the best system of Government for Ontario.
84. That men spend more money and time on their own pleasure than do women. (Humorous).
85. That the world has been growing better during the past hundred years.
86. That all industrial disputes should be submitted to compulsory arbitration.
87. That Canadian banks should be owned and operated by the Government.
88. That the wages of women should be the same as those of men for similar positions.
89. That in the past hundred years war has done more good than harm.
90. That Italy has contributed more to the progress of mankind than has Greece.
91. That more crime is due to wealth than to poverty.
92. That Lloyd George is a greater statesman than was Gladstone.
93. That the Scotch have done more for Canada than have the English.
94. That the support of home missions is more important than that of foreign missions.
95. That religion is a greater factor in the world's progress than is science.
96. That the invention of gunpowder and other high explosives has been a curse.
97. That the 48 hour week should be adopted on the farm.
98. That it would pay every owner of a hundred acre farm to own and operate a tractor.
99. That horse power is of more use to the farmer than gasoline power.
100. That the operation of the Adolescent School Act is in the interests of the farmer.
101. That the Clydesdale is a better farm horse than the Percheron.
102. That the farmer is better qualified as a legislator than is the lawyer.
103. That the extension of the franchise to women has on the whole been productive of good results.
104. That the use of labour-saving machinery has on the whole not been in the interest of the labouring classes.

105. That dairy cattle are more profitable than beef cattle.

106. That the "At Home" is an undesirable form of social entertainment.

107. That a Horticultural Society should be organized in this township.

108. That organized labour is a greater danger to the state than organized capital.

109. That the system of "tipping" should be discontinued.

110. Resolved that the two-party system in politics has outlived its usefulness, and present-day conditions call for a new political party.

111. That experimental farms should be under the control of the Provincial rather than the Dominion Government.

112. That Canada is of more importance to the British Empire than is Australia.

113. That women should not enter parliament.

II—PLAYS

Organization. In making arrangements for the performance of a play the first thing to do is to make a list of the people who might take part, and then select a suitable play. After the play has been selected it is necessary to choose actors for the various parts, and to appoint people to be responsible for different duties. Some one must be appointed to take full charge of rehearsals and act as critic or "coach." Some one must also act as stage manager and property man. He must be responsible for providing for the scenery and the articles or "properties" that are to be used in putting on the play. He must also arrange for costumes and "make-ups." Some one must also be appointed as business manager. He will procure copies of the play, arrange for the use of the hall, and look after the advertising and the printing of tickets and programmes. Before the play is put on, different people must be appointed to act as prompters, to take charge of the curtain, and to shift the scenes. These people should all be present at the last two or three rehearsals. Some of the actors who have minor parts may act as stage manager and business manager, but, if possible, the actors should be left wholly free, especially on the night of the performance.

Rehearsals. It is generally better to have the characters in certain scenes meet in groups to rehearse their parts, and to call a general rehearsal only when the different groups have prepared their respective scenes. At the first rehearsals little should be done except read over the different parts, but actors should learn their parts as soon as possible. It is not possible to begin *acting* until the actors can do without their papers. The success of the play depends largely upon the rehearsals. It is important that every one should attend the rehearsals and that the rehearsals should begin promptly. Unless an actor can guarantee to attend all rehearsals and be on time, he should not take part at all.

Directions to Actors. *Speaking:* As an actor your first duty is to make yourself heard. Watch your enunciation, and be careful to pronounce the final consonants of your words distinctly. Do not drop your voice on the last words of your sentence. Try to speak naturally, and avoid the stilted unnatural tone of one who is merely reading a piece. Choose such positions on the stage as will enable you to direct your voice towards the audience. Speak as much as possible from the front of the stage.

Acting: Study the character that you are supposed to represent, and try to make the action interpret his thoughts and feelings. The actor must supply a great deal of movement that is not indicated in the stage directions. Do not be stiff, but on the other hand, do not overdo the action. Every movement should mean something, and must appear natural. Act toward the front of the stage, and study how to get off the stage gracefully.

Books. For those who require further help the following books are recommended:—

How to Produce Amateur Plays, by B. H. Clark; cloth, 144 pages; published by Little, Brown and Company, Boston; contains chapters on rehearsing, staging, lighting, scenery, and costumes.

Practical Stage Directing for Amateurs, by Emerson Taylor; cloth, 194 pages; published by E. P. Dutton & Company, New York; contains chapters on rehearsing, directions for the amateur actor, make up, staging, and scenery.

Shakespeare for Community Players, by Roy Mitchell; cloth, 142 pages. Treats of rehearsals, costumes, stage setting, lighting, make-up, music, and other subjescts. Published by J. M. Dent & Sons, Toronto, Ont.

The Minstrel Encyclopedia: 225 pages; contains full instructions regarding the production of a Minstrel Show. Published by The Walter Baker Co., 5 Hamilton Place, Boston 9, Mass.

Selection of a Play. There are few plays available that are suitable for amateur production in rural communities. Plays of the better class generally require elaborate staging, and special training on the part of the actors. The majority of the plays that are put on in rural communities are trashy in the extreme. There are few of them that contain a clean wholesome plot or that leave with the audience any picture or any message that is worth remembering. Most of the plays that deal with rural life are mere burlesques; but in recent years a demand has arisen for plays that will represent the best elements of rural life, and will make a serious appeal to a rural district. A few of such plays have been produced and have been acted with success. Of the following the first four are strictly rural plays; and the last two are studies in village life.

Rural-Life Plays

THE BROWN MOUSE: A rural play in four Acts, for eight male and five female characters. The Brown Mouse is a plea for better rural schools, and is a dramatization of Herbert Quick's novel, "The Brown Mouse." Jim Irwin, Colonel Woodruff's hired man, and "the brown mouse" of the play, is by a "fluke" engaged as teacher of the Woodruff School Section. Instead of following the regular curriculum, he relates all his teaching to the operations of the farm and the interests

of country life. He meets with bitter opposition, and the play tells the story of his final success. "The Brown Mouse" contains a serious message and "gives the audience something to think about," but at the same time it is filled with humor, and the interest is increased by the love story that runs through the play. This is one of the best rural plays available. Published by Samuel French, 28 West 38th Street, New York.

JUST LIKE A WOMAN: A rural comedy in one Act for three men and three women. An old farmer and his wife have been persuaded by their son to sell out and move to the city: but they find that there are many things connected with their old home on the farm that they cannot bear to part with and they finally decide that they will be happier if they remain on the farm. There is not much plot in this little play, but it is full of humor and it is wholesome in tone. It will provide an enjoyable half hour's entertainment for a rural community gathering. Published by T. S. Denison and Company, Chicago.

BETWEEN TWO LIVES, a comedy in three Acts, for eight men and five women. Harry Wilson is a farmer of the old type. He is "land poor," and he refuses to listen to the advice of his son Jack, who wishes him to adopt new methods. Under these conditions Jack finds life on the farm unbearable. He goes to the city and attends the Agricultural College. After four years he returns to the farm, and as a result of his scientific methods of farming rescues the farm from its run-down condition, pays the mortgage off and saves his father from ruin. There is a good deal of humor in the play and there are also several minor love stories which add to the interest of the plot. This is an excellent rural play. Published by the Orange Judd Co., New York.

BACK TO THE FARM: A rural play in three Acts, for four women and six men. Merton Merill, the hero of the play, is discontented with life on the farm. He quarrels with his father and leaves home. He goes to the Agricultural College and learns scientific farming. In the meantime, Rose Meade, the country school-teacher, with whom Merton is in love, has gone to the University to study Domestic Science. Five years later, Merton returns to the farm and is reconciled to his father. He saves the farm from ruin and in the end marries Rose. The play has for its "lesson" the value of scientific methods of farming, but although it has a serious message it is brightened by humorous passages. It is an excellent play for rural communities. Published by the University of Minnesota, Agricultural Extension Division, University Farm, St. Paul, Minn.

KINDLING THE HEARTH FIRE: A rural play in three acts, for six men and six women. A prosperous farmer refuses to spend money on conveniences for his overworked wife. His daughter declares she will never marry a farmer and leaves home to work in a city departmental store. She is not happy in the city, and is finally led by a Welfare League worker to see the greater possibilities for happiness in her own home. She returns, and the last Act shows the happy contented farm home two years later. Published by the University of Minnesota, Agricultural Extension Service, University Farm, St. Paul, Minn.

THE NEIGHBOURS: A play in one Act for two men and six women. Carry Ellsworth, a village "old maid" has just learned that an orphan boy, her sister's child, is being sent to her to bring up. In order to help her, "the neighbours" plan a pleasant surprise for her. In the end she receives word that the boy is not to be sent to her after

all, but in the meantime in planning the surprise, the people of the village have shown themselves to be true "neighbours." The play is a delightful study of village life, but it has not much real "plot." As a play, however, it is much above the average. Published by The Walter Baker Co., 5 Hamilton Place, Boston 9, Mass.

UNCLE JIMMY. A comedy in one Act, by Zona Gale, for three men and five women. Uncle Jimmy the "handy man" in the village, has always had a longing to travel. At last the opportunity comes, but he finds that old associations are too strong for him and he cannot make up his mind to go. A delightful play, with both humor and pathos, and suitable for acting out of doors. Published by The Walter Baker Co., 5 Hamilton Place, Boston 9, Mass.

EARLY OHIOS AND RHODE ISLAND REDS: A comedy in one Act, for three women and two men. This is a rural play which deals with the advantages and disadvantages of rural life. It has little plot, but the situations are amusing, and it is wholesome in tone. Published by The Perine Book Co., 1413 University Ave., Minneapolis, Minn.

Short Plays

One Act Plays usually require no change of scenery; they do not take up the whole evening; and since only a few people take part, there is usually little difficulty with rehearsals. But on the other hand they usually call for more finished acting than the longer plays.

FEED THE BRUTE: A short comedy in one Act, for two women and one man. It is an amusing take-off, showing the effect of a good supper in softening the temper of a grumpy husband. Published by Samuel French, 28 West 38th Street, New York.

SPREADING THE NEWS, by Lady Gregory. A comedy in one Act, for seven men and three women. This is one of the most amusing of Lady Gregory's Irish plays. It is a take-off on the way in which gossip is spread. It can be staged with little difficulty and is easily acted. It is contained in a volume entitled "Seven Short Plays," published by The Walter Baker Co., 5 Hamilton Place, Boston 9, Mass.

MISS MARIA, by Margaret Deland. A comedy in one Act, for three women and two men. Two of the women and one of the men are middle-aged. It is the love story of Miss Maria, whose fortune has been squandered by an unpractical nephew, and who finally married an eccentric old bachelor who has for many years been in love with her. In order to be effective, it must be well prepared. Published by Samuel French, 28 West 38th Street, New York.

JOINT OWNERS IN SPAIN: A comedy in one Act, for four women. The scene is laid in an Old Ladies' Home. Two of the women, Miss Dyer and Mrs. Blair, are unable to get along with the other women in the Home; so the matron decides to make them room together. At first they quarrel with each other, but finally they hit on the happy idea of dividing the room by a chalk line so that each may have her own quarters. The play is humorous, but with a touch of pathos. It is an excellent study of human nature, and if well acted should be very effective. Published by Walter H. Baker & Co., 5 Hamilton Place, Boston 9, Mass.

THE PROS AND CONS: A farce in one Act for three women and one man. Brenda and her husband have quarrelled and have announced to their friends that they have agreed to secure a separation. But through the intervention of their cousin Evangeline they are length led to make up the quarrel. In the meantime, however, Evangeline has kept a note-book in which she has entered the "Pros and Cons" for

and against marriage. The dialogue is clever and the situations amusing, and the play can be staged without much difficulty, but requires clever acting. Published by Samuel French, 28 West 38th St., New York.

INDIAN SUMMER: A comedy in one Act, for two men and two women; simple staging and costume. Monsieur Briqueville has quarrelled with his nephew Noel because he has married an upholsterer's daughter, against his uncle's wishes. Noel's young wife, Adrienne, obtains a place in the uncle's household and completely wins his affections. Then she reveals the fact that she is Noel's wife, and a reconcilation follows. Published by Samuel French, 28 West 38th Street, New York.

THE TEETH OF THE GIFT HORSE: A comedy in one Act for four women and two men. Aunt Marietta, a very sweet and lovable old lady, has given her niece and nephew two hand-painted vases as a wedding gift. Some years later the vases are sent to a rummage sale, and the following week Aunt Marietta comes unexpectedly on a visit. The efforts to conceal from her the fact that her vases have been sold at the rummage sale give rise to very amusing situations. An excellent bit of comedy. Published by Samuel French, 28 West 38th Street, New York.

A MARCH WIND: A play in one Act for two male and two female characters. Melia, a middle-aged woman, and her husband, Enoch, live happily together until her cousin Josiah, a sharp-eyed spiteful old man, comes to visit them. His ill-natured insinuations are the cause of a misunderstanding between the husband and wife: but in the end they are reconciled. This is a delightful little play, full of humor and pathos, and wholesome in every way. Published by the Macmillan Company of Canada, Toronto.

A LITTLE FOWL PLAY: A farcical comedy in one Act, for three male and two female characters. A chicken which was intended for Mr. Tolbooth has been delivered by mistake at Mr. Warren's. The Warrens, who are very hard up, but trying to keep up appearances before their servant and neighbours, take the chicken in and roast it for dinner. The resulting complications are very amusing: but everything ends happily. Published by Samuel French, 28 West 38th Street, New York.

THE DEAR DEPARTED: A comedy in one Act for three female and three male characters. When Abel Merryweather is found dead in bed, his two married daughters and their husbands proceed to divide up his belongings, and, as usual, they do not agree to the division. In the midst of the dispute, to their astonishment Abel walks in. He had been merely drunk, not dead, and an amusing situation follows. Published by Samuel French, 28 West 38th Street, New York.

THE PHILOSOPHER OF BUTTERBIGGENS: A comedy in one Act for two men and one woman,—in Scotch dialect, a humorous sketch showing how the grandfather, the "philosopher," managed to get his own way when opposed by his daughter. Published by Samuel French, 28 West 38th Street, New York.

GETTIN' ACQUAINTED: A comedy in one Act for two women and one man. John Purdy has been paying attention to two sisters for fifteen years, but has never "proposed" to either of them. He is simply "Gettin' Acquainted." The play shows how one of the sisters makes him declare his intentions. It is an amusing little sketch. Published by T. S. Denison and Company, Chicago.

FOURTEEN. A play in one Act, for two women and one man. The hostess has invited fourteen guests for dinner. At the last moment

some of them send their regrets and her efforts to get others to take their places so as to have the proper number are very amusing. Published by The Drama, 59 East Van Buren St., Chicago, Ill.

MRS. BAGG'S BARGAIN DAY. A comedy in two Acts for two men, nine women, and children. This is a humorous take-off on bargain day experiences in a departmental store. The situations are of course exaggerated, but the play is entertaining. For permission to act apply to the author, Katharine McDowell Rice, Worthington, Mass.

HEARTS TO MEND. A play in one Act, for two men and one woman. This is a bright fanciful little comedy, but the actors must be able to sing the snatches of song that occur throughout the play. Pierrot is a writer of songs, but has become tired of his wife Pierrette and can no longer write songs as he used to. A tinker who comes along crying "Tins to mend" talks to Pierrot and shows him how to regain his lost happiness. Pierrot follows his advice, and the story ends happily. Published by The Stewart Kidd Company, Cincinnati, Ohio.

THE HAPPY DAY. A farce in one Act for seven women. This is an amusing take-off on the preparations for a fashionable wedding. The bridegroom rebels against so much "nonsense," and for a time it looks as if the wedding would not take place at all. But at the critical moment the lovers decide to run away and get married; and all ends happily. Published by The Walter Baker Company, 5 Hamilton Place, Boston 9, Mass.

A CHRISTMAS CAROL. A dramatized version of Dickens' story, for seven men, with a boy and a girl. Published by The Walter Baker Company, 5 Hamilton Place, Boston 9, Mass.

THE WORKHOUSE WARD. A comedy in one Act, for two men and one woman. Two old Irishmen who are paupers in the workhouse, quarrel violently, but when the sister of one of them comes to offer him a home for the rest of his life he refuses to leave unless his companion goes too. But when the sister leaves they quarrel again as violently as before. A very humorous Irish play. Published by Samuel French, 28 West 38th St., New York.

THE RIDER OF DREAMS: A comedy in one Act for two men, a woman and a child, in the negro dialect. The plays shows an incident in the life of a negro family, and portrays the character of the "coloured folk." It is full of humour, but the actors must be able to imitate the negro dialect. Published by The Macmillan Company of Canada, Toronto.

WHY THE CHIMES RANG: A play in one Act for one woman, one man, two boys, and in addition a number of men and women who appear in costume but do not speak. This is a dramatization of a Christmas story of the middle ages. It should not be attempted unless there is a possibility of putting it on artistically. Suitable costumes, scenery, and lighting, are essential to its success. Published by Samuel French, 28 West 38th Street, New York.

GRANDMOTHER ROCKER. A comedy in one Act for four men, five women, and several children, or all parts may be taken by children. The housekeeper has called in the auctioneer to sell off the old-fashioned furniture because she thinks the bride and groom who are about to arrive will not want it. When they are left alone the articles of furniture, represented by different characters discuss their fate. But when the bride comes she falls in love with the old furniture. This play will depend for its success upon the furnishings and costumes, but with proper care it will provide a delightful entertainment. Published by The Walter Baker Company, 5 Hamilton Place, Boston 9, Mass.

Longer Plays

It is difficult to find longer plays for amateur acting that are not complicated, and that are at the same time wholesome in character. For those who do not wish rural plays the following are suggested:—

A PAIR OF SPECTACLES: A comedy in three Acts, for eight men and three women. Benjamin Goldfinch is a kind-hearted, generous man, while his brother Gregory is selfish and miserly. Benjamin, however, finding that he has been deceived in one instance, becomes suspicious of even his best friends, and, for the time being, looks at the world through the spectacles of Gregory. In the end, however, he finds that his friends are true to him and the play ends happily for all concerned. Although the situations in this play are improbable, there are fewer complications than in most plays, and the tone is good. Published by Samuel French, 28 West 38th Street, New York.

THE CRICKET ON THE HEARTH: A drama in three Acts, for four men and five women. This is a dramatization of one of Dickens' Christmas Stories. It is an excellent play provided it can be acted naturally. If the action is stiff and mechanical the play will be a failure. Published by Samuel French, 28 West 38th Street, New York.

MARTHA BY-THE-DAY: A comedy in three Acts, for seven women and five men. The play is a dramatization of the well-known novel by the same name. The plot is somewhat complicated, and is melodramatic in parts. But the character of Martha with her strong sympathies, her courage in facing difficulties, and her ready wit and humor, is in itself enough to "make" the play. Published by Samuel French, 28 West 38th Street, New York.

THE COLONEL'S MAID. A comedy in three Acts, for six men and three women, with the rather hackneyed plot of two lovers whose fathers are antagonistic to each other. The means employed to win over the fathers create some amusing situations. A Chinese cook adds greatly to the humour of the play by his impertinence and his shrewd observations. Published by The Walter Baker Company, 5 Hamilton Place, Boston 9, Mass.

THE LADIES OF CRANFORD. A dramatized version of Mrs. Gaskell's "Cranford," for twelve women. Published by The Walter Baker Company, 5 Hamilton Place, Boston 9, Mass.

Dramatic Entertainments

The following is a list of Dramatic Entertainments, some of which may be found suitable for Women's Institutes. In most cases they may be made more humorous by introducing local hits:

THE MINISTER'S DREAM. A Thanksgiving Fantasy in two scenes, for six men and three women, with harvesters, elders, spirits of the maize, Indian braves, who have no spoken parts. There is no plot; but the costumes, dances, and music are capable of charming effects if proper care is taken with them. Published by Duffield & Company, 20 East 19th St., New York.

A GENTLE JURY. A farce in one Act, for twelve women and one man. A very amusing take-off on the discussions of a jury composed entirely of women. Published by The Walter Baker Company, 5 Hamilton Place, Boston 9, Mass.

SUNBONNETS. A comedy in two Acts, for eleven women. This is a take-off on the rivalry of The Women's Aid Society and The Ladies' Benevolent Society, in the same village. Published by The Walter Company, 5 Hamilton Place, Boston 9, Mass.

A BUSINESS MEETING: A short play in one Act, for ten women. This is a take-off on the way in which women conduct a business meeting. Published by Walter H. Baker & Co., 5 Hamilton Place, Boston 9, Mass.

THE OLD PEABODY PEW, by Kate Douglas Wiggin. A play in two Acts for eight women and one man. Part of the story is told in the introduction to each Act, and a good reader is required to read these introductions. The first Act gives a humorous picture of the meeting of the carpet committee of the village church: the second Act contains the love story of the play, when Justin Peabody returns to claim his old sweetheart of many years before. The stage must represent the interior of a church with pulpit and old-fashioned pews. This play, if well acted, can be made very effective. Published by Samuel French, 28 West Thirty-Eighth St., New York.

THE PINE HILL LADIES' AID: A humorous entertainment in three Acts, for fifteen or twenty women and five men. This is a "take-off" on the ways of women, as seen in a Ladies' Aid meeting, a suffrage convocation, and a vaudeville entertainment. It is full of humour of a wholesome sort, and is interspersed with songs. Publishers, Geo. F. Rosche & Co., Chicago.

"HOW THE STORY GREW": A one Act entertainment requiring eight women. As the title suggests, this is an amusing account of the way in which a simple story may be exaggerated and distorted as told by one neighbour to another. Published by Walter H. Baker & Co., Boston 9, Mass.

AUNT SUSAN'S VISIT: An entertainment, for seven women and three men. This, and other entertainments by the same author, are light sketches which depend for their interest upon the humorous "take-offs" on certain types of character. Published by the author, Clara E. Anderson, Ottawa.

PUNKIN RIDGE. This and other dialogues contained in "McBride's Comic Dialogues," were favorites in rural communities a generation ago, and are still appreciated by rural audiences. Published by The Fitzgerald Publishing Corporation, 18 Vesey St., New York.

NOTE—Because of the frequent changes in prices, the cost of plays has not been quoted. These plays may be secured through the Students' Co-operative Association, O.A.C., Guelph. In the case of most plays a small royalty is charged, and in such a case it is necessary to write to the publishers to secure permission to act the play.

III—COMMUNITY MUSIC

Music should have an important part in the programme of community gatherings. Every one can take part in community singing; and music, more than anything else, helps to promote good social feeling. It must not, of course, be allowed to crowd out other forms of entertainment, such as plays, debates, and public lectures; but, on the other hand, programmes without music are not likely to hold the interest of any audience.

In preparing musical programmes for your community gatherings there are several questions to be asked and answered. In the first place, who are the people, young or old, in the community, who can contribute individual numbers to your programme in the form of either vocal or instrumental selections? The Music Committee of your Community Club should make a careful survey of your community and do everything possible to encourage local talent.

UNIVERSITY OF

In the second place, what is it possible to do in the way of organizing quartettes, choruses, orchestras or bands? With one or more of such organizations in the community it is much easier for your committee to provide programmes, and the Community Club is less likely to fall to pieces.

In the third place, what can be done to encourage musical appreciation among those who live in your community? In other words, if you yourself do not sing or play in public, can you not learn how to listen appreciatively to the music of others? All too often the playing of an instrumental solo or a selection by the orchestra is looked upon as an opportunity for general conversation. Needless to say this is an evidence of lack of good breeding as well as lack of musical appreciation. The development of a taste for good music is possible to every one, and should not be beyond the range of people living in the country. A good music teacher should be able to give to any audience in a very short time some instruction as to different forms of composition and some information as to the different musical instruments which go to form an orchestra. A phonograph should make you familiar with the best music, and papers on composers should be an interesting part of your programme. A winter spent with this object in view should transform the dullest member of your audience into an appreciative listener.

In the last place, can you introduce community singing as a feature of the programmes of your community gatherings? Community singing cannot be carried on without a leader, and the leader must be prepared to give some time and study to methods of conducting community singing. It is best to begin with old songs that every one is familiar with: patriotic songs, camp songs, folk songs, negro songs; and for variety's sake, part songs, songs in costume, and even singing games, may be introduced. With these simple songs as a basis, newer and more ambitious songs, even including passages from oratorio and opera, may be gradually introduced. Everything depends upon the ability and judgment of the leader, but community music must never be allowed to flag or grow stale.

There are four ways in which community gatherings may be provided with the words and music of the songs. By the use of:

1. Song charts. Large sheets of paper with the words written on them and hung up where the audience can read them. Where convenient a blackboard may be used instead.

2. Song sheets. These may be furnished by arrangement with your local printer, or may be secured from The Department of English, Ontario Agricultural College. Each sheet contains approximately 25 songs, the words only, without music. Price, postpaid, 5 cents each; 50 cents a dozen; $4.00 a hundred.

3. Song slides. Where a lantern is available the words and music may be thrown upon a screen. Slides may be purchased at 35 cents each from any of the following: The Methodist Book and Publishing House, Queen and John Streets, Toronto; Charles Potter, 16 Adelaide Street West, Toronto; The Presbyterian Publications, Church and Gerrard Streets, Toronto. Write to them for lists.

For Canadians the best book is "The Community Song Book," containing 126 songs and chorus, with music; published by A. Cox & Co., Queen and Victoria Sts., Toronto. Price 35 cents.

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